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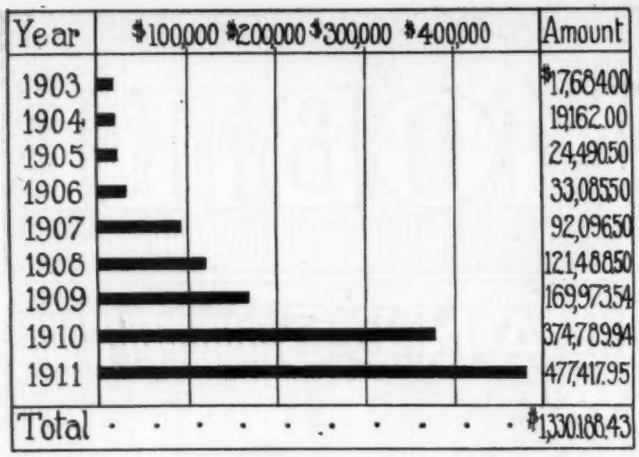
THE AUTOMOBILE

NEW ENGLAND'S SHOW

The New England field offers interesting study to both the manufacturer and the sales manager

BOSTON will be the cynosure of the eyes of New England automobilists next week when the annual automobile show is thrown open to the people of the Hub and of the surrounding territory. In this connection a glimpse of the early development of the automobile industry, much of which took place in New England, is of great interest. The first American-made cars to be placed upon the market were products of New England ingenuity and, although subsequently the great bulk of the car manufacturers chose cities of the Middle West in which to locate their plants, a number of them are to be found in New England states. Moreover, New England has an amazing number of automobile parts and accessory makers whose products are distributed and sold not only throughout the United States and Canada, but also in many foreign countries. It is significant that the companies whose machines marked the introduction of the American automobile have, for the most part, kept up with the advance of the industry and at the present day are turning out cars to which the people of New England may point with pride.

New England has led the entire country in the adoption of motor-driven fire department vehicles from their introduction. At the present day there are more of these in New England than in any other portion of the United States comprising the same amount of territory. The chassis of the first motor fire apparatus built in this country was made by the Knox Automobile Company for the city of Newburgh, N. Y., in 1905. The body was built by the C. N. Perkins Company, Lawrence,



Comparison of annual registration fees in Massachusetts

Mass. This company was absorbed by the Knox company in September, 1907, and since then C. N. Perkins has been in charge of the fire-engine department of the Knox Automobile Company. Several of the other automobile companies of New England began to study the application of gasoline motors to fire apparatus at an early stage in the development of this phase of the industry and have had excellent motor-driven fire-wagons on the market for years.

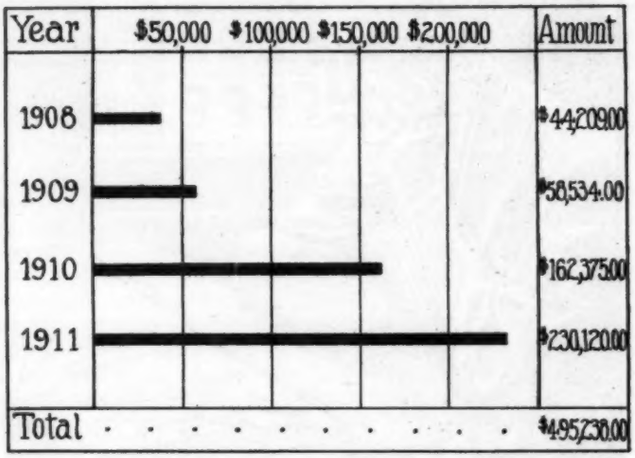
At the close of the year 1911 there were 74,489 automobiles, of both pleasure and commercial type, registered in the New England states. Massachusetts, of course, is far in the lead with a registration of 38,696. Connecticut is second with 13,994, and Maine is third with 10,045. Then comes Rhode Island's 6,017, followed by New Hampshire with 4,489 and Vermont brings up the rear with 3,247. The total of the registration fees collected in New England states during the past year comes very close to a million dollars.

As regards automobile manufacturers, Massachusetts is still ahead with nineteen, eleven of whom make gasoline pleasure cars, while four make gasoline trucks and two make taxicabs. Electric pleasure cars and steam pleasure cars are each represented in the state by one manufacturer each. Connecticut is second again with a total of seven manufacturers, all of whom make gasoline cars, four devoting themselves to pleasure cars while three build trucks. Rhode Island retains third place with three makers, two of whom manufacture gasoline pleasure cars while the third makes gasoline trucks. The total of manufacturers of New England states is twenty-nine. The distribution of these is graphically represented in the tabulation given below.

When we come to the makers of automobile parts and accessories the New England states are well represented, as may be seen in the table on page 575. The total number of these makers in New England is 401, the states retaining the same order as before. Massachusetts has 210, Connecticut 153, Rhode Island 23, New Hampshire 7, Maine 6 and Vermont 2. The product of these makers consists of all sorts of parts and accessories for automobile use from castings, bearings and bodies to valves, wheels and windshields.

Basing the estimate on the registration in each state for 1911, Maine has one pleasure car to each seventy-four of population and one truck to each 7,504. Connecticut and Massachusetts have one pleasure car to each eighty-five of population, but Massachusetts has one truck to each 1,550, while Connecticut has one to each 2,500. Rhode Island comes next with one pleasure car to each ninety-one, and one truck to 3,400 of its people. Vermont has one pleasure car to each 110, and one truck to each 4,800 of its population.

While everyone is aware of the wonderful growth of the automobile industry in the United States, comparatively few people are at all familiar with the stories of the acorns from which the mighty oaks of our modern motor car business have



Connecticut registration fees for the past four years

grown. Some of them, of course, were developed as branches of large corporations, but these were in the minority. To those for whom the automobile has fascination, and that includes practically everyone, the early history of the great American automobile companies is full of interest. Realizing this, THE AUTOMOBILE has secured brief accounts of the inception and development of several of the leading New England companies.

Early Development of the Alco

ARRANGING these alphabetically, the first one which strikes our attention is the American Locomotive Company, Providence, R. I. This company was formed some time before the day of the automobile for the purpose of studying methods of locomotion and of building vehicles for transportation. At the time of the company's organization the locomotive was the only rapid means of travel and the energies of the company were therefore directed in that direction. Soon after the introduction of the automobile the men at the head of the company, foreseeing the possibilities of the motor truck, began experimenting in the latter part of 1905.

When it was decided to build a touring car the company obtained American rights to build the French Berliet. The American Locomotive Berliet was built up to 1909. In 1909 the company gave up the rights to build this car but retained the right to use its general design.

The company had begun experimenting with automobile trucks at an early state of their development, having purchased several foreign models. In 1906 the first Alco truck was put into service. It was tried out by an express company which put it to the hardest tests for 2 years. At the satisfactory conclusion of

TABLE SHOWING AUTOMOBILE REGISTRATIONS IN NEW ENGLAND FOR 1911, WITH THE AMOUNT OF FEES COLLECTED

State	Total reg.	New reg. 1911	Reg. up to 1911	Com. veh. reg.	Total reg. fees
*Connecticut	13,994	3,326	10,668	482	$230,120.00
Maine	10,045	2,757	7,288	100	12,462.01
Massachusetts	38,696	7,336	31,360	2,120	477,417.95
New Hampshire	4,489	913	3,586	78	52,956.00
Rhode Island	6,017	798	5,219	162	74,265.54
Vermont	3,247	801	2,446	75	59,643.00
Total	76,489	15,831	60,567	3,017	$906,864.50

*Including non-residents.

AUTOMOBILE MANUFACTURERS AND DISTRIBUTION BY STATES

State	Gasoline pleasure cars	Electric pleasure cars	Steam pleasure cars	Gasoline trucks	Taxicabs	Totals
Connecticut	4	..	..	3	..	7
Massachusetts	11	1	1	4	2	19
Rhode Island	2	..	..	1	..	3
Total	17	1	1	8	2	29

the trial the first Alco truck to be sold was placed on the market. Now the truck department constitutes a very important part of the company's business.

The early history of the concern which is now the Columbia Motor Car Company, is somewhat complicated and has never been set before the public in a clear, comprehensive manner. The following brief account of the development of the company was furnished THE AUTOMOBILE by the courtesy of Herman F. Cuntz, of the Automobile Board of Trade, New York City. Mr. Cuntz has been connected with the upbuilding of the Columbia from the first and consequently has a full and detailed knowledge of the facts.

The Columbia Motor Car Company, Hartford, Conn., succeeded, in June, 1909, to the business of the Electric Vehicle Company. The latter had succeeded, in 1900, to the business of the Columbia and Electric Vehicle Company, which was preceded by the Columbia Automobile Company. The foundation for the Columbia Automobile Company was the motor carriage department of the old Pope Manufacturing Company, which had commenced business in 1895.

Beginnings of the Columbia

TO begin at the beginning, the Pope Manufacturing Company had experimented with an electrically-driven tricycle for some time, and Colonel A. A. Pope, hearing of the experimental work of H. P. Maxim, took steps to secure his services and thereupon organized the motor carriage department of the old Pope Manufacturing Company.

In the winter of 1898-1899 there were in New York City about thirteen electric cabs being operated by the Electric Vehicle Company, which had been organized in 1897. This company was founded on the work of the pioneers, Morris & Salom, who organized the Electric Carriage and Wagon Company in Philadelphia and sold out to the Electric Vehicle Company.

Early in 1899 the Electric Vehicle Company wanted to place an order for 100 electric cars and this led to the amalgamation of the Electric Vehicle Company with the Pope Company. As a result the motor carriage department and all development of its plant and organization were incorporated at Hartford as the Columbia Automobile Company in 1899. Then the Electric Vehicle Company moved its equipment to the plant at Hartford and the manufacturing was taken up by a new corporation, the Columbia and Electric Vehicle Company, in June, 1899. Early in 1901 it also acquired the Riker Motor Vehicle Company, Elizabethport, New Jersey, and for 6 months during that year the Elizabethport factory was made headquarters, with the main office of the company at 100 Broadway, New York, and with a European manager and a large and complete organization.

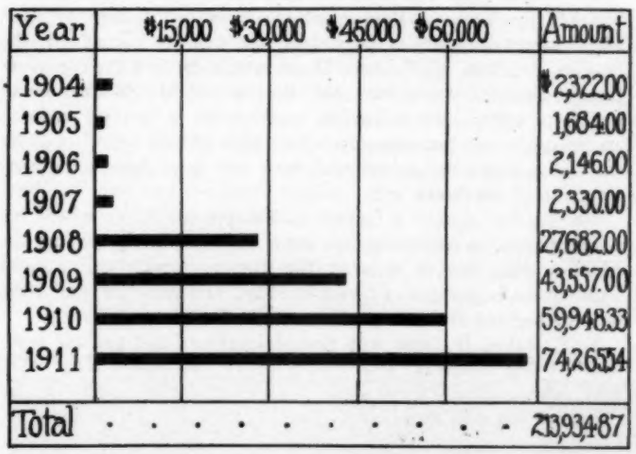
The Columbia Motor Car Company took over the business as a going concern in June, 1909, continuing the manufacture of gasoline automobiles and electric cars. Upon the formation of the United States Motor Company in 1910 the Columbia Motor Car Company was acquired by it and shortly thereafter the manufacture of a model equipped with the Knight engine was begun.

Columbia cars were among the first to be adopted by fire department officials, one of Chief Croker's first cars being a Columbia touring car which was used as a chief's wagon. Many New England cities are using Columbia cars in similar capacities, notably Boston, where a Columbia was first used for this purpose.

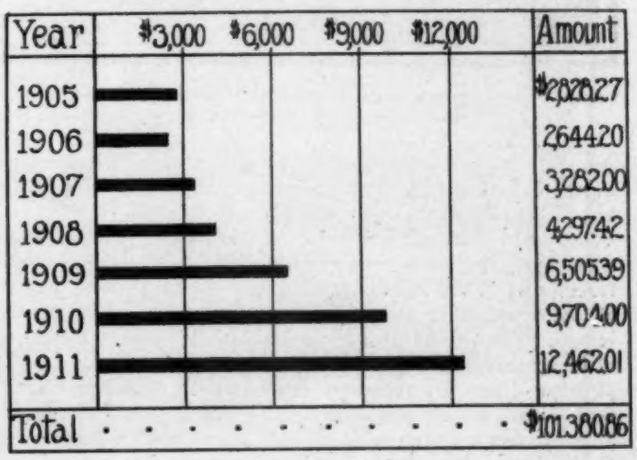
The Knox Automobile Company, Springfield, Mass., was started as a result of the construction of a successful engine by H. A. Knox and Herman G. Farr, who brought it to the attention of some men, including W. E. Wright, now vice-president of the company, who were especially interested in industrial educa-

TABLE SHOWING DISTRIBUTION OF MAKERS OF AUTOMOBILE PARTS AND ACCESSORIES IN THE NEW ENGLAND STATES

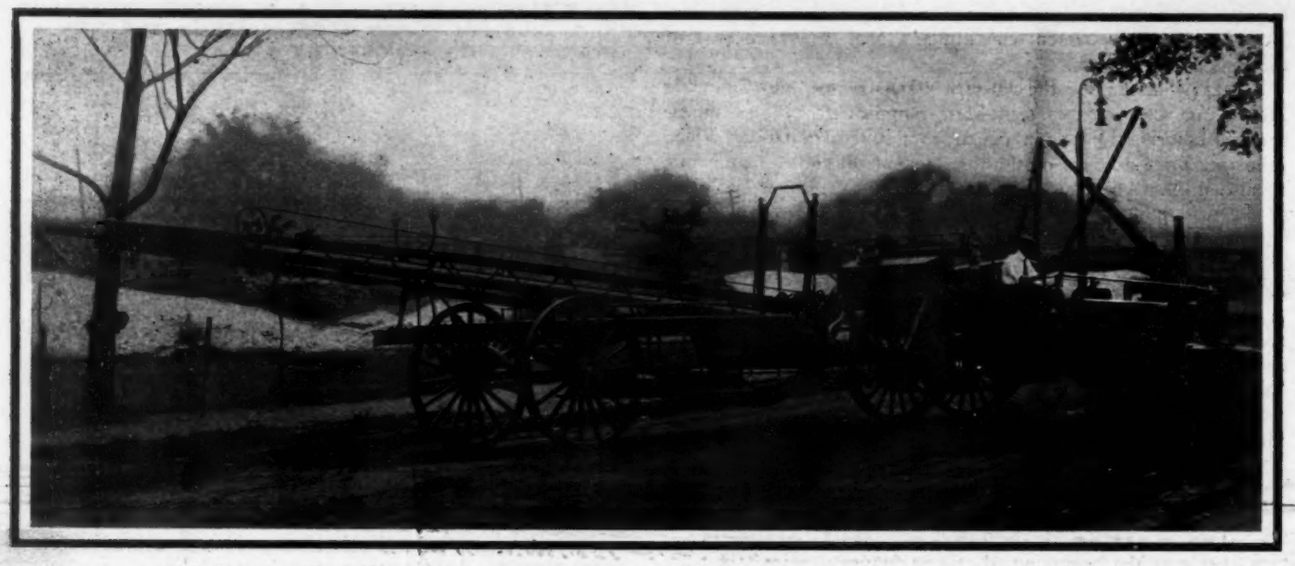
	Connecticut	Maine	Massachusetts	New Hampshire	Rhode Island	Vermont	Total
Aluminum, brass and bronze castings	23	..	19	1	6	..	49
Bearings, ball and roller	5	..	2	1	2	..	10
Bodies	14	..	26	..	..	..	40
Brakes	3	..	..	..	..	..	3
Carbureters	2	..	9	1	1	1	14
Clutches	3	..	2	..	..	..	5
Die and iron castings	18	..	16	1	1	..	36
Differential gears	4	1	2	..	2	..	9
Drop forgings	11	..	7	..	1	..	19
Dry batteries	1	..	2	..	..	..	3
Frames	1	..	2	..	..	..	3
Gauges, battery	1	..	3	1	1	..	6
Gauges, cylinder compression	..	..	1	..	..	..	1
Gauges, gasoline tank	1	..	2	..	..	..	3
Gauges, tire	1	..	2	..	..	..	3
Generators and tanks	1	1	3	..	..	..	5
Horns and horn accessories	5	2	4	..	1	..	12
Jacks	1	..	1	..	..	..	2
Joints, ball and universal	6	..	3	..	..	..	9
Lamps	10	..	12	..	..	..	22
Lubricators	1	..	7	..	..	..	8
Magnetos	3	..	10	..	..	..	13
Motors and dynamos	2	..	4	1	..	..	7
Motors, gasoline	1	..	1	..	..	..	2
Motors, steam	..	..	1	..	..	..	1
Mufflers	1	..	1	..	..	..	2
Radiators	3	..	..	..	..	..	3
Rims	2	..	2	..	..	..	4
Shock-absorbers	1	1	5	1	..	..	8
Springs	8	..	6	..	..	1	15
Steering gears	..	..	2	..	1	..	3
Storage batteries	..	..	2	..	1	..	3
Tanks	2	..	7	..	..	..	9
Timers	2	..	7	..	1	..	10
Tires, pneumatic	2	..	2	..	..	..	4
Tops	4	..	19	..	..	..	23
Transmission gears	1	..	3	..	2	..	6
Valves	1	..	4	..	2	..	7
Wheels, wood	2	..	1	..	..	..	3
Windshields	6	1	8	..	1	..	16
Total	153	6	210	7	23	2	401



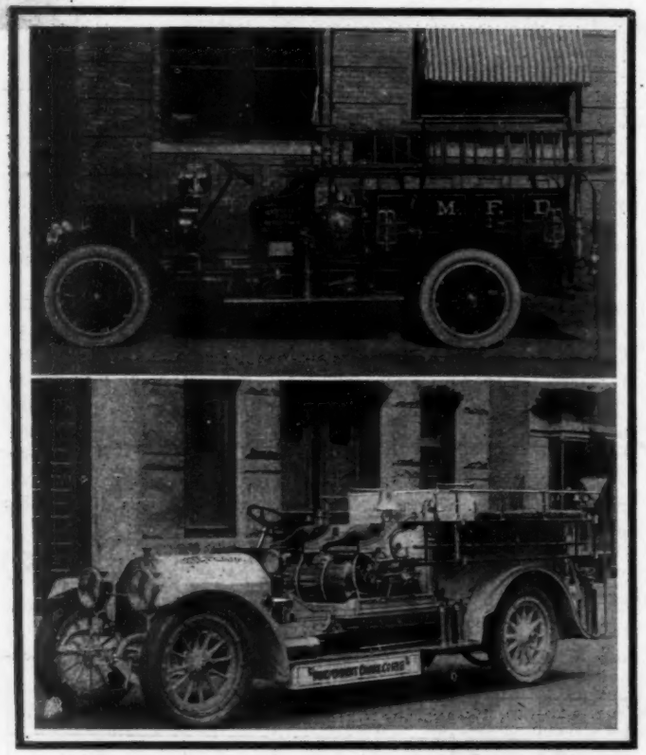
Rhode Island registration fees since 1903 compared



Comparing amount of yearly fees collected in Maine



The Knox-Martin tractor used on the water-tower of the Springfield fire department makes turning easy



Upper—Pope-Hartford used by Mansfield, Mass. Lower—Locomobile in use at White Plains, N. Y.

tion and who had established a school for industrial training, in which Knox and Farr, then young men, were graduates in the first class in industrial training in Springfield.

The motor truck built by the Knox Company in 1901 for Smith & Murray, a dry goods firm of Springfield, Mass., was one of the forerunners of the rapidly growing motor truck business, and an off-shoot from that is the fire apparatus business which has developed by leaps and bounds until practically every community of importance in the Northeastern States has one or more pieces of motor-driven fire apparatus, some of them, including Springfield, Mass., having almost completely gone over from horse-drawn to motor-driven vehicles, while in one place, West Haven, Conn., horses have been abandoned entirely for motor-driven apparatus.

Another development from the early days came through a Knox salesman employed by the company in 1904, Charles H. Martin, who saw the possibilities of the tractor, especially in the advantage of mounting the motor upon lighter springs than those necessary to carry the load and the chances to turn in a shorter space than the motor truck, if a successful tractor could be made with one wheel in front and the rear end attached to the front axle of the truck to be drawn. Working on these ideas for several years he developed plans for a tractor which has been recently placed on the market by the Knox Company under the name of the Knox-Martin tractor.

The Locomobile Company of America, Bridgeport, Conn., was founded by Amzi L. Barber, who, with John Brisben Walker, after some negotiation, purchased the patents owned by the Stanley Brothers, of Newton, Mass., which covered the construction of steam automobiles. Mr. Barber and Mr. Walker being unable to agree upon a suitable location for a factory, came to an amicable understanding by which both parties were to enjoy the rights under the patents and each was to engage in the construction of machines.

Mr. Walker started a factory at Tarrytown, N. Y., where for a few years he constructed a steam automobile, known as the Mobile. Mr. Barber secured the factory which the Stanley Brothers had operated at Newton, Mass., and early in June, 1899, he incorporated the present Locomobile Company.

S. T. Davis, Jr., who was elected treasurer and general manager of the company, with offices at 11 Broadway, New York City, immediately started work organizing his forces and getting the shop into such shape as to enable it to turn out machines.

Bridgeport Selected by Loco

SHOPS where parts were made were secured at Westboro, Mass., Worcester, Mass., and Bridgeport, Conn., and a forge shop at Worcester was taken over.

Eventually business increased to such a stage that it was almost impossible to secure men in the Massachusetts towns in which the shops were located, and the proposition of building parts in so many widely scattered factories became so very difficult that it was decided to construct the shops in some town where it would be possible to secure both rail and water facilities and where an ample supply of high-grade labor was available.

After considerable investigation it was decided that Bridgeport, Conn., would probably offer the best situation. Ground was secured there and work on a new factory was started.

About this time the popularity of the steam car commenced to fall off, gasoline having proved far superior as a motive power, not only because of its simplicity, but also because of the in-

creased touring radius. Realizing that the days of the steam car were limited, the company secured the services of A. L. Riker.

Early in the year 1902 Mr. Riker connected himself with the company, and at the Chicopee plant, the old Victor automobile factory, he designed and commenced the construction of the first Locomobile gasoline car.

Immediately after testing this car out arrangements were made to construct these cars in quantity and several were built and delivered before the Madison Square Garden Show, held during the winter of 1902-1903, which marked the first public exhibit of the Locomobile gasoline car. From this time on gasoline cars were constructed exclusively, each type being a logical development of its predecessor. The Locomobile Company was one of the first to take up the manufacture of automobile fire department vehicles and now builds a number of these each year. Some of the company's products in this line are shown in the accompanying illustrations.

Evolution of the Pope-Hartford

THE original Pope Manufacturing Company, Hartford, Conn., was organized in 1876 by Colonel A. A. Pope for handling small patented articles but he turned to the manufacture of bicycles, producing in 1877 the first bicycle in the United States. In later years the company established the motor carriage department from which the prototype of the Columbia automobile was developed as already related. The Pope company was then merged with the American Bicycle Company, and in anticipation of this the motor carriage department was sold to another company. When a few years later the old Pope interests bought back several factories from the American Bicycle Company they again took up the construction of automobiles. In 1902 the first Pipe-Hartford car was produced. Today the entire Hartford plant of the company is given over to the manufacture of these cars, the various lines of Pope bicycles being made in the company's bicycle plant at Westfield, Mass. The past four years have witnessed the growth of a large business in motor fire-wagons and other automobiles for municipal use.

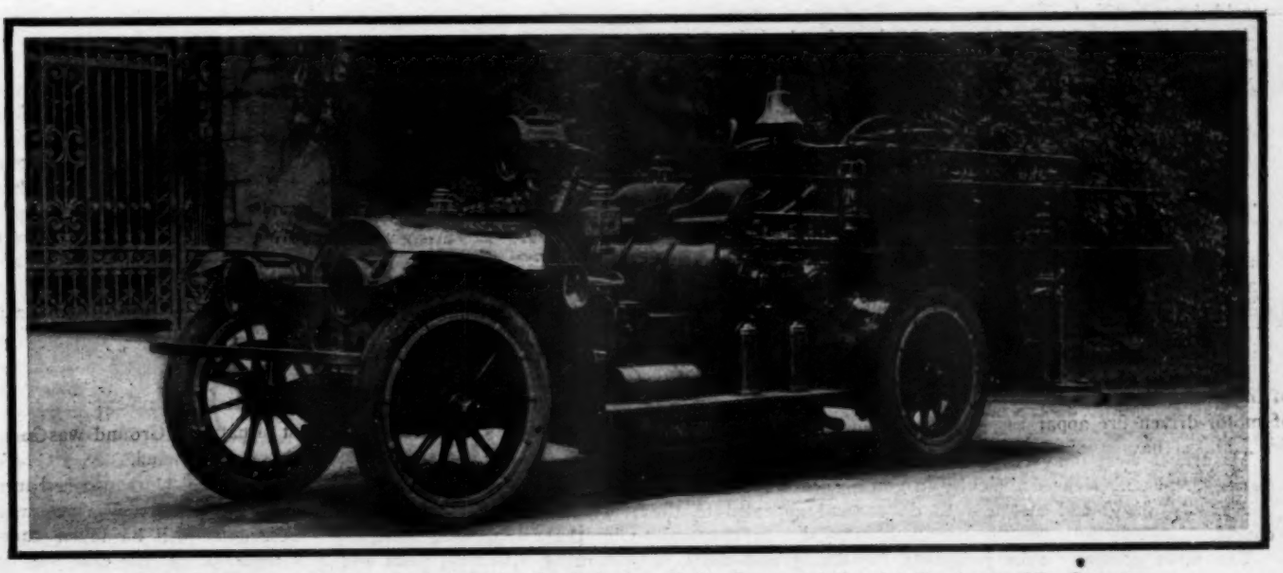
The Stevens-Duryea Company, Chicopee Falls, Mass., was one of the companies which had small beginnings. A little more than 20 years ago, in a small shop in Springfield, a young man named J. Frank Duryea designed and completed a motor car of the high wheeled type, with steel tires, having as a power unit a single cylinder hydro-carbon engine. The result was satisfactory mechanically, but not financially.

The motor was refined in 1902 and after the winning of the Chicago *Times-Herald* contest a first lot of fifteen wagons were built for sale in Springfield. William M. Remington, who was chief draughtsman for Mr. Duryea, was made a partner after repeated combinations, dissolutions and reorganizations, in the early 'nineties, and the concern set about the work of producing a road wagon for a moderate price suitable for use on American roads.

About 1900 satisfactory arrangements with the J. Stevens Arms and Tool Company were concluded, due to the advanced thought of its president and treasurer, I. H. Page, who made a proposal to Mr. Duryea to build the cars in the immense Stevens Fire Arms factory at Chicopee Falls, Mass. This was the dawning of a new era for the Duryea automobile, and from that alliance dates the beginning of a record of marvelous expansion and success.

From these glimpses of the history of some of New England's automobile companies, it is readily seen that the people who are now looking forward to the Boston show have reason to be proud of New England's progress.

Upper—Knox hose wagon of Coeur d'Alene, Idaho. Lower—Locomobile fire patrol, fully equipped



Powerful fire-department vehicle built for the Irvington, N. Y., fire association by the Locomobile Company

In the Legal Field

Warner Company Sues Stewart & Clark for Infringement

Panhard Sued—Klaxon vs. Every-Ready—Carter Corporation Says It Is Not Insolvent

UNUSUALLY interesting to the automobile industry and users of automobiles generally is the suit of the Warner Instrument Company against Stewart & Clark in the United States District Court in New York City, which is on the calendar for next week, but which will likely not be reached for 2 weeks or more.

The suit is based upon claims 1, 10 and 11 of letters patent 823,237, granted June 12, 1906, to the complaining company. Claim 11 is the broadest among the three at issue and covers the idea of employing a split-ring magnet operating the pointed disk alongside, instead of through the field.

The defect overcome by this device, according to the holders of the patent and some of the witnesses who have been examined in taking the testimony in this case, is the same one that makes electric light meters run too fast in certain cases. It is claimed that by operating alongside instead of through the field of the magnet, the life and strength of the magnet are conserved. In the electric light meters when the magnet has become demagnetized the hold of the attraction is weakened on the mechanism with the result that the meter speeds up and the consumer has to settle for a lot of unused current. In the case of the speedometer an analogy might be drawn by saying that a weakened magnet might cause an instrument to show an illegal rate of speed.

Another claim at issue is for an automatic compensator to equalize the operation of the instrument in varying atmospheric temperatures. Samuel E. Darby, who is handling the case for the Warner side, announced Monday that he had just received word from the Patent Office confirming to the complainants the right to this element of the device.

The array of expert talent produced by both sides in taking testimony in this matter is impressive. On behalf of Stewart & Clark Professor Wilcox, head of the department of electrical engineering at Armour Institute; Professor Carhartt, occupying a similar post in the University of Michigan; Professor Kennelly, of Harvard, and Dr. Sylvanus P. Thompson, of London, one of the most noted experts in electrical engineering in the world, have testified.

For the Warner side Professor Schlichter, head of the department of electrical engineering at Columbia; Professor Cady, of Wesleyan, who has been engaged in research work in electricity at Washington, and Dr. Johnstone Stone, a Boston expert, are relied upon to establish the claims of the patent.

Delivery Company Sues Panhard

An interesting question of law is involved in the suit of the Interboro News Delivery Company against Société Anonyme Panhard in the United States District Court. The facts in the case as shown in the pleadings are as follows:

In the spring of 1910 the Interboro News Delivery Company, which was under contract with the New York *Globe* and other publications to deliver its papers in the outlying districts and to distributing points, contracted with the Panhard company for two 18-horsepower trucks, rated at 2 tons carrying capacity.

The trucks were delivered in due course, but the company declares that it experienced difficulty in getting service from them and finally abandoned attempts to do so and appealed to the courts.

The news company asks judgment for $6,663 and costs of action. The Panhard company, besides entering a general denial of all material allegations made by the plaintiffs, asks for judgment on a counterclaim for $969, which it is alleged is the value of parts, replacements and labor involved in repairing the two trucks during the time they were in operation.

The case was to have been tried by a jury in the United States District Court on Friday, but on motion of Coudert Brothers for Panhard, the matter went over until March 11. Mr. Sloan, of Kellogg & Emery, is handling the matter for the news company.

Klaxon vs. Ever-Ready Injunction

Arguments as to whether or not the temporary injunction granted on behalf of the Lovell-MacConnell Manufacturing Company against the American Ever-Ready Company for alleged unfair competition in the manufacture of an electric automobile horn by the defendant company that is similar to the Klaxon product of the complainants shall be made permament were presented before the United States Circuit Court of Appeals Friday morning.

The arguments of the attorneys for the defense were to the effect that it was impossible for their company to make horns unless the design adopted could be used. For the complainants it was stated that the defendants' horn was so much like the Klaxon in external appearance that it might cause confusion in the minds of purchasers. It was also pointed out that some of the recent additions to the horn field did not follow the Klaxon rectangular design in appearance.

Drury W. Cooper acted for the complainants. The case was heard by the full bench and was taken under advisement. A decision is expected in about 3 weeks.

Carter Concern Denies Insolvency

WASHINGTON, D. C., Feb. 24—Answer to the bankruptcy proceedings recently instituted against it has been made by the Carter Motor Car Corporation, through Frank L. Carter, its treasurer. The company denies it is insolvent and attacks the jurisdiction of the court, claiming its plant is at Hyattsville, Md., and if bankruptcy proceedings are to be begun they should be filed in Maryland.

The answer in the equity suit, on which receivers were appointed by the court, is declared by Treasurer Carter to have been signed by A. Gary Carter, president of the corporation, without consulting the corporation's attorney and without authority from the directors of the corporation. The matter has been taken under advisement by the court.

Trying to Adjust Züst's Affairs

The Züst Motor Company, of New York, representing in a selling capacity the Züst factory, failed some time ago and has been in the hands of the courts for several months. The liabilities, according to schedules filed this week, amount to $37,000. Harry Sidney Stewart, attorney, acting for the company, has presented a proposition of composition on a basis of 15 per cent. of the proven claims. If this is accepted, and Mr. Stewart states that a majority of the creditors are agreeable, the arrangement will be concluded March 4.

The Züst company will probably be reorganized in the near future.

Sued for Tire Cover Infringement

Suit has been brought by the Allen Automobile Specialty Company, of New York, against the Niagara Automobile Tire Cover Company for alleged infringement of the Nathan tire-cover patent under No. 799,662. The patent in question was acquired by the complaining company. Testimony will be taken commencing with next week and it is unlikely that the case will be

ready for hearing much before the summer vacation of the courts.

The complainant in bringing the suit did not insist on a temporary injunction and the Niagara concern is not checked in its manufacturing operations. The amount of damages involved cannot be approximated.

Winding Up M. E. & S. Company

Schedules filed on behalf of the Motors Engineering and Sales Company, which is now in bankruptcy, as was stated exclusively in these columns at the time, show assets of $24,736, and liabilities of $24,478.

No receiver has been named and the affairs of the company are being wound up with much celerity. The chief creditors were Messrs. Griswold and Webb, officers of the concern.

Combine to Fight Stilwell Bill

ALBANY, N. Y., Feb. 28—The Stilwell bill, providing for a changeable lighting scheme on the rear of the car, showing red below green when the car is slowing down, met with sharp opposition in the Codes Committee yesterday, but will probably be reported out with that committee's sanction.

It is argued that the bill is unnecessary and would work a hardship upon automobile owners in that the device described is patented and that its operation is problematical. It was shown by the speakers that the adoption of such a law would tend to keep tourists out of the state. The bill reads as follows:

Section 1. Subdivision eleven-a of section fourteen hundred and twenty-five of the penal law is hereby amended to read as follows:

11a. With intent so to do, damages in any manner an automobile or other motor vehicle; or, who drives or uses an automobile or other vehicle on a public highway without said automobile or motor vehicle being provided with efficient brakes, and also with a suitable bell, horn or other signal and also a suitable signal upon the rear visible in the reverse direction when about to stop or slow down; and be so constructed as to exhibit, during the period from one hour after sunset to one hour before sunrise, two lamps showing white lights visible within a reasonable distance in the direction toward which the vehicle is proceeding, also a red light visible in the reverse direction, and also a suitable signal upon the rear displaying a green light below the red light, visible in the reverse direction, when about to stop or slow down; or,

Section 2. This act shall take effect September first, nineteen hundred and twelve.

Stutz Wins the Bakersfield Race

BAKERSFIELD, CAL., Feb. 23—Covering 212 miles through the oil fields at a rate of approximately 37 miles an hour, Stutz car No. 10 won the Bakersfield road race yesterday, driven to the limit by Jack Bayse, who also entered the car. The winner also took down the special cup for the fastest time between Bakersfield and Taft. Mitchell No. 8, entered and driven by Phil Klipstein, was second, and Buick No. 7, driven by Goochenauer, was third.

Two cars met with mishaps during the running. National 3, Packer, which is the same car with which Herrick won the Phoenix race, snapped its rear axle in the second round. Buick 2 turned turtle near Maricopa and its driver and mechanic sustained broken collar bones.

The time of the winner was 5:44:59, 1 hour 20 minutes ahead of the second car. Besides the placed cars there were twelve other starters as follows: Knox, Kline, Nyberg, Pope-Hartford, Flanders, three Buicks, Stutz, National, Reo and Ford.

Twelve Entries for $50,000 Race

INDIANAPOLIS, IND., Feb. 26—The entry of the Knox, driven by Mulford, makes the field for the $50,000 speedway cup, up-to-date, twelve cars, nearly all of which have been prominent in past motor car events. The other entries to the race are two Nationals, driven by Wilcox, Herr and Merz; two Stutz cars driven by Anderson, Zengle and Knipper; two Case cars driven by Disbrow and Jagersberger; two Mercedes cars from Germany driven by DePalma and Wishart; a Fiat with Teddy Tetzlaff named to drive; a Lexington with Harry Knight nominated and a Simplex to be driven by Bert Dingley.

Klaxon Sues Simplex

Allege That Defendants Use Horns Similar in Design to Theirs

Dyer Suits Go Over—Stromberg After Flechter for Infringement—Adjusting Zust Affairs

SUIT has been filed on behalf of the Lovell-MacConnell Manufacturing Company against the Simplex Motor Car Company, of Mishawaka, Ind., alleging that the automobile makers are equipping some of their cars with electric horns similar in design and appearance to the Klaxon device and infringing the patent rights of the company. The horns in question are made by the Automobile Supply Manufacturing Company, of Brooklyn.

The suit was filed in the United States District Court at Indianapolis, and according to attorneys for the defense, answer will be made and the suit will remain in that condition pending the settlement of the main suit between the complainants and the Automobile Supply Manufacturing Company.

This suit will be heard in the United States District Court at Brooklyn, some time prior to adjournment for summer vacation.

Stromberg Alleges Flechter Infringes

Suit has been filed in the United States District Court by the Stromberg Motor Devices Company, of Chicago, against the L. V. Flechter Company, manufacturers of the Flechter carbureter, alleging infringement of letters patent 928,042.

The particular matter in issue is what is known as the two-spring construction, described under claims 3, 4, 5 and 6 of the patent. William A. Redding is acting for the defense.

The bill asks for injunction, accounting and damages and will probably be up for answer in April.

For the defense it is claimed that the two-spring principle is old. The complainants state that their patent covers the matter in valid form. The litigation is only the start of what may prove to be a widespread movement to test the validity of a number of carbureter patents.

Dyer Suits Go Over Till April

The four Dyer suits, brought in the name of the Enterprise Automobile Company, will not be formally answered on rule day in March. A stipulation extending the time for filing answer is being prepared to carry the cases over until the first Monday in April.

The answer that had been prepared in these cases is being revised so as to cover the variations that exist between the four different suits. The subject matter is not quite identical in all of them, hence the stipulation to extend the time for filing.

Schimpf Contest Board Chairman

William Schimpf, of Brooklyn, is head of the Contest Board of A. A. A. This announcement leaked out unofficially Tuesday and while undoubtedly true, is regarded as premature. The contract now being prepared between the Manufacturers' Contest Association and the American Automobile Association has not been ratified by either party so far, owing to delays that have intervened because of the illness of the chairman of the committee representing the manufacturers.

Mr. Schimpf was appointed to fill the unexpired term of Samuel M. Butler as chairman of the Contest Board after the death of Mr. Butler. He is an amateur and for the first time in several years the position is being filled by such an executive. The tendency of the times is toward amateur automobile races and the appointment of Mr. Schimp will foster such events.

To Succeed Carter Concern

New Company Incorporated to Take Up the Manufacture of the Washington Car at the Capital

Michelin Clips Its Prices—Old Company Going into the Manufacture of Fire Apparatus

WASHINGTON, D. C., Feb. 24—According to announcement of H. O. Carter, the Washington Car Manufacturing Company will be incorporated to take up the manufacture of Washington cars, both pleasure and commercial, now produced by the Carter Motor Car Corporation. Carter's statement is, in part, as follows:

"The company will be capitalized at $600,000. Of this, $500,000 will be common stock and $100,000 will be preferred, bearing 7 per cent. annual dividend, payable semi-annually. The common stock will be issued to present stockholders of the Carter Motor Car Corporation, which is capitalized at $2,000,000, all common, no preferred, at the rate of one share of the new company's stock for four shares of the Carter Motor Car Corporation's stock. The preferred stock will be divided into 10,000 shares of a par value of $10 a share, which will be sold at its par value, bearing 7 per cent. interest, payable semi-annually.

"A brief synopsis of present orders for Washington cars for 1912 delivery totals $244,800. The net profit to be derived from this gross volume of business is $27,000. In addition to this there is to be derived a net profit on repairs and parts for cars that have been sold since 1909 of $5,000, giving a net income for dividends of $32,000. Deducting $7,000 for interest on the preferred stock leaves a balance of $25,000 for dividends on the common stock, giving shareholders of common stock 5 per cent."

Olds Works to Build Fire Apparatus

DETROIT, MICH., Feb. 26—The Olds Motor Works, of Lansing, is preparing to add motor fire engines to its line, according to a statement recently given out by W. J. Mead, vice-president and general manager. The Olds concern has manufactured fire-fighting apparatus on a small scale and two of their engines rendered most efficient service in the fire that recently destroyed the Downey House in Lansing. For the present a combination chemical and hose wagon will represent the major part of the company's output in this particular line.

Michelin Company Reduces Prices

Prices of Michelin tires and tubes have been sharply slashed an average of about 10 per cent. On the smaller sizes the cut amounts to less than that, but in the big sizes it ranges to almost 15 per cent. As an example, the regular 32 by 3 1-2 size was $25.85 and now is $24.50. The 37 by 5 size was $66.10 and has been cut to $58.57. Tubes were reduced in about the same proportion.

Warren Company Increases Capital

DETROIT, MICH., Feb. 26—Coincident with the announcement of the change in the management of the concern, the Warren Motor Car Company has increased its capital stock from $300,000 to $600,000 to provide a larger working capital and additional manufacturing facilities. This action was taken at a special meeting of the stockholders last Wednesday. At the same time a new board of directors was named and the following officers were elected: President, Homer Warren; vice-president and general manager, Lucius E. Wilson; second vice-president, Charles Ritter; treasurer, C. Haines Wilson; secretary, H. W. Allen.

It is understood that J. G. Bayerline, the retiring general manager, will continue to be identified with the motor car industry. President Warren speaks of him in terms of the highest praise. Mr. Wilson will take charge April 1.

De Tamble Company Reorganized

Reorganization of the De Tamble Motor Company, of Anderson, Ind., has been accomplished and the company gains not only the additional capital it required for manufacturing and marketing its product, but it also secures the services of James W. Sansberry as president and general manager.

The company, like many of the smaller concerns, has been cramped for sufficient working capital. It was announced at the time of the negotiations looking toward reorganization that there were plenty of orders on the books, but that manufacturing was hampered by lack of ready money.

Mr. Sansberry is a banker, head of the National Exchange Bank, and the control of the reorganized company rests with him and his associates. The capital stock of the company has been increased to $200,000, and of this amount the Sansberry party holds $101,000, giving full control.

Charles H. Walters, formerly secretary and general manager, has been made general superintendent. The De Tamble company is represented in the metropolitan district by the Shepherd Motor Car Company, which also handles the Everitt line.

Shortage of Cars Handicaps Makers

DETROIT, MICH., Feb. 26—Local motor car manufacturers complain of a serious shortage of freight cars, which has, in some instances, compelled them to ship their product by round-about routes with the result that deliveries have been seriously delayed. This condition has been aggravated within the past week by the blizzard, which practically tied up the movement of all freight in this section for two days.

Slight Upward Tendency in Rubber

Crude rubber prices are steady, according to cable advices from London. The last change in quotations was an advance of 1-4 penny for the better grades of up-river Para. The auction sale scheduled for this week will bring out a stock of 850 tons, with the possibility of 100 tons additional. Trade has been of small proportions and the offerings were largely of cheaper grade stock.

The rubber auction in London witnessed the sale of 350 tons at prices only fractionally lower than previous levels. There was demand enough present to impart a rather firm tone to the market. Closing figures were 1-4 penny lower.

Decatur Changes Name with Location

GRAND RAPIDS, MICH., Feb. 25—The Grand Rapids Motor Truck Company will be the name of the Decatur company when it has been removed from Decatur, Ind., to Grand Rapids. The company has purchased part of the old Harrison Wagon Works near Fulton Station and with it 5 acres of ground. The remodeling and equipment of this property will be begun at once. The two-story building contains about 20,000 square feet of floor space and has a railroad siding. It is expected that the company will be ready to begin operations in March.

The following officers and directors were recently elected: President and general manager, M. E. Brackett; vice-president, E. A. Clements; secretary and treasurer, Frank T. Hulswitt. The Grand Rapids directors are Carroll F. Sweet, E. A. Clements, Henry L. Adsit, Frank T. Hulswitt, William F. McKnight

and John Blodgett. The outside directors are M. E. Brackett, Decatur, Ind.; W. J. Vesey, Fort Wayne, Ind.; John I. Taylor, Boston.

Another Price Jump in Gasoline

Gasoline took another leap upward on Monday when the announcement was made that the price had been advanced by the Standard Oil Company to 12 cents a gallon. This is 3 cents a gallon higher than it was last summer and marks the second advance of 1 cent within 2 months.

The price follows the course of crude oil and is said to be in the nature of an adjustment between the present level of the crude product and the gasoline price, which was not advanced sufficiently to correspond with the rise in crude oil prices.

The advance means an additional cost of approximately $12,000 a day to automobile operators in the United States.

Empire Reorganization Complete

INDIANAPOLIS, IND., Feb. 26—The reorganization of the Empire Motor Car Company, which has been under way for some little time, has been completed under the name of the Empire Automobile Company, which has been incorporated with an authorized capitalization of $100,000. The company is now seeking a new factory location in this city, and hopes before many weeks to be turning out machines.

A. Waldheim, of St. Louis, has been elected president; David May, Cincinnati, vice-president; Charles B. Sommers, Indianapolis, secretary-treasurer and Cecil E. Gibson, treasurer of the Fisher-Gibson Company, of this city, factory director and general manager. David Sommers, of St. Louis, is the fifth director. All but Mr. Gibson are identified with the May-Stern-Sommers syndicate, which operates a string of furniture stores through the country.

All of the machinery of the Empire Motor Car Company, which has not built any cars for several months, has been taken over. The old Empire factory is now being used for the manufacture of the Prest-O-Lite self-starter, which necessitates the new company finding another factory.

It is the intention of the new company to build a 25 horsepower car in roadster and five-passenger touring car types, each to sell at $850. The company, this year, will manufacture 1,000 cars. Offices of the company will be maintained, at least, temporarily, at 238 1-2 Massachusetts avenue.

Mr. Gibson is a pioneer in the local motor car business. He founded the Gibson Automobile Company some years ago, which was merged, little more than one year ago, with the Fisher Automobile Company, under the name of the Fisher-Gibson Company.

The Empire Motor Car Company was organized by Carl G. Fisher and James A. Allison, who have desired to retire from the manufacturing end of the motor car business for some little time.

Proposed New Factory for Lima

LIMA, O., Feb. 26—Preliminary consideration has been given to a proposal made by W. W. McIntyre, of Detroit, formerly of the Northern Motor Company, affiliated with the General Motors Company, to establish in Lima a $100,000 factory to manufacture a $500 roadster automobile and a $900 touring car, both designed by Mr. McIntyre.

Case to Retire First Mortgage Bonds

Announcement has been made that the J. I. Case Threshing Machine Company will retire its first mortgage bonds bearing 5 per cent. interest on May 1. The price at which the issue will be taken in is 108 1-2 and accrued interest. The company recently funded this debt through the sale of preferred stock.

Berkshire Company Revived

Reorganized Concern Now Building New Plant on Charles River at Cambridge, Mass.

Completion of Empire Company's Reorganization—Omaha to Have a New Factory

COMPLETE reorganization of the Berkshire Motors Company has been made and the company is building permanent quarters on the Charles River front at Cambridge, Mass. In the meantime the company has rented temporary quarters, and the assembly department will be installed therein during the Boston show.

The officers of the company are James Addison, president and treasurer; Stuart H. Clapp, vice-president; Edward B. Belcher, secretary, who with F. W. Stickle constitute the board of directors.

Mr. Belcher will serve as chief engineer. The company will build both six and four-cylinder cars and will cater principally to the New England trade. The company was formerly located at Pittsfield.

New Omaha Company Organized

OMAHA, NEB., Feb. 26—It was announced Saturday that an automobile factory is to be started at once in Omaha. D. W. Henry, formerly designer and general manager of the Colby car factory at Mason City, Ia., has been in the city and has interested Omaha men in the project. The articles of incorporation have been filed at Lincoln.

The factory will be near Twentieth street and Ames avenue. This is adjoining the Stroud machine works, and that manufacturer has agreed to allow the new company space in his building for turning out the first cars, until the factory is completed.

The company is to be called the Omaha Motor Company. The capital stock will be $500,000 common and $500,000 preferred. It is said that the Omaha men have already subscribed $100,000 of the needed amount.

Mr. Henry already has a design for the car, which is to be of the five-passenger touring type, with an underslung frame, which will sell for $1,250. It is expected to have the first car out April 1. The factory, which will be started in the near future, will be a two-story brick building, 400 by 125 feet. This will be the first automobile factory in Omaha.

New Starter Company Organized

BATTLE CREEK, MICH., Feb. 26—The Hayes Manufacturing Company has been organized here to manufacture self-starting devices for automobiles. The stockholders are F. C. Hayes, F. A. Buchner, A. J. Arnold, A. M. Minty, W. E. Goff, A. Kapp, J. W. Emerson, W. S. Hauch, C. Hauch, J. D. Jones, W. L. Larkin, A. Z. Hollman, L. J. Charles and B. Z. Wines.

Truck Club to Parade April 13

April 13 has been selected as the date for the annual parade of the Motor Truck Club. The arrangements are in the hands of a special committee, who will prepare a program.

It is the purpose of the club this year to secure as many entries of privately owned trucks as possible. Six or seven cups will be furnished by the club for the winners in various classes.

Would Raise Registry Fees

Governor Foss, of Massachusetts, Says Automobiles Increase Expense of Road Maintenance

Bills For and Against Automobilists Passed by Kentucky Legislators

BOSTON, MASS., Feb. 26—Governor Eugene N. Foss of Massachusetts, following the dictates of Mayor Fitzgerald, of Boston, and the advice of the highway commission, has sent in a recommendation to the Bay State Legislature urging that the fees for motor cars be increased. It was thought that he might do it in his inaugural, but he did not, but Mayor Fitzgerald has been so insistent that the Governor finally yielded. He argues along the same old lines that the motorists will be satisfied to pay it because it will save them repair bills, etc.

Now the Legislature gets the recommendation and it means there will be hearings on it. If the committee on roads and bridges follows the usual custom of some of its predecessors the hearings will be held during motor show week, when it will be impossible for the motorists and dealers to get up to the State House. It is this sort of treatment that makes the motorists angry, for they do not believe they get a square deal. They are wondering if the Governor is playing politics this time. The highway commission has been without a chairman since last November, when Chairman Parker resigned and Governor Foss has not even mentioned a candidate except indirectly. Before his election the job was promised to Mr. Synan, one of the powerful men in the western part of the state, who was on the outs with the Governor, but he came back into line and helped to turn the state for Governor Foss. He is still waiting for the nomination, however, with the chances of being turned down by the council. Meanwhile the commission is being run by its two Republican members, while the Democrats who aided Governor Foss to win are getting sore because nothing has been done.

If such a bill passes the motorists plan to get busy politically next fall as there is an intimation that Governor Foss may run again, and as he won by about 5,000 last year it would take but half that number to change the result this year. And there are enough men in Boston alone driving and repairing cars that could do this. Governor Foss has not been on friendly terms, anyway, with the motorists, for he passed up their banquet given by the Bay State Automobile Association a year ago. This year the club officials did not invite him. And Mayor Fitzgerald, too, who has been very popular with the Boston men, is getting in bad odor by triyng to put such measures through.

The text of Governor Foss' recommendation to the Legislature asking for an increase of fees is, in part, as follows:

"The use of automobiles now requires an expensive type of road construction and greatly increases the cost of road repairs and maintenance.

"There are now about 40,000 automobiles in Massachusetts, aggregating about 1,000,000 horsepower. The fees received from these cars last year were $380,760, or approximately an average of 38 cents per horsepower.

"Such a fee does not seem adequate in view of the rapidly increasing cost of the state highways. In fact, an average fee of $1 per horsepower would probably save more than that amount to the car owners in repairs and tire renewals if applied to the upkeep of roads.

"The expenses of road and boulevard maintenance are borne by the general public, but are incurred very largely by reason of the wear and tear of automobiles. Therefore, I urge that a revised schedule of motor fees be considered at once, at an average of not less than 80 cents nor more than $1 per horsepower, and I think that the fees for commercial automobiles should also be increased, but to a smaller extent.

"With these increased fees the state will be able to make more liberal provision for counties and for towns and cities which may now bear an undue part of the general expense of road construction and maintenance, particularly within the Metropolitan area, where the wear and tear of automobile travel is concentrated.

"I recommend utilizing the fees directly in full, to meet the costs of the state in maintaining highways, and to help in meeting local expenses of the same type on an equitable basis."

Knight and Newcomb Bills Pass

LOUISVILLE, KY., Feb. 26—So amended as to leave the license fee on automobiles the same at present, $5 to $20, according to the horsepower of the machine, the Knight bill, seeking to regulate the use and speed of automobiles, passed the House last Tuesday by a vote of 71 to 0. While it was being considered in the House the rival measure, introduced in the Senate by H. D. Newcomb, of Louisville, was being considered by that body. Consideration of the Newcomb bill went as far as Section 2 when the Senate adjourned for the day. The consideration of the Newcomb measure will be resumed in the Senate at a later date.

The fate of the Newcomb bill is being eagerly watched by Kentucky motorists. Local owners of machines now state that there will be no trouble in securing enough votes in the Senate to beat this bill. The majority of motorists favor the Knight bill, which is also championed by the Louisville Automobile Club and the Louisville Automobile Dealers' Association.

Advocates of the Knight bill feared that if the Newcomb measure reached the House first it would pass that body, due to the prejudice on the part of some of the representatives from rural districts against the motor car.

It is generally conceded by automobile owners that certain sections of the Newcomb bill will find difficulty in securing sufficient support to pass the Senate.

Motor organizations throughout the state are organized to fight the measure, and the representatives and senators are being urged to vote against the Newcomb bill.

LOUISVILLE, KY., Feb. 24—By a vote of 17 to 8, the Newcomb automobile bill passed the Senate today. The author of the measure was jubilant over his success in putting it through the upper house, and expressed confidence in his ability to get it through the lower body. Senator Newcomb said that he had made the fight, unassisted, against the press and motorists.

The Knight bill, the rival measure, which passed the House several days ago, has been ordered printed by the Senate. Unless it is returned within the next four legislative days, it will be at the mercy of the Senate Committee on Rules, of which Senator Newcomb is a member. The latter has a friend in the person of Representative L. C. Owings, of Jefferson county, member of the House Rules Committee, who probably will do what he can to have the Newcomb bill voted on in that body. There is keen rivalry between Representative Knight and Senator Newcomb as to which bill will be enacted.

Two amendments to the Newcomb measure were adopted before it was finally placed upon its passage. One provides that the jail sentence shall apply only in certain cases, and the other provides that the revenue derived from the State license tax on automobiles shall go into the state roads fund.

Trying to Tax Crude Rubber

Along with the rest of the ineffectual tariff changes now being agitated in Washington there is a movement on foot looking to the placing of crude rubber on the tariff lists. President Taft announced a long time ago, prior to the attempted passage of Schedule K, the wool tariff and other ill-starred sections, that he would not approve tariff legislation that did not have the official sanction of the Tariff Board.

As none of the recently proposed measures has such sanction, politicians generally place little faith in their enactment.

According to the reports, part of the duty that has been borne by sugar will be placed upon rubber. In speaking of this matter one statesman is quoted as saying: "The tariff has two objects in theory. First, to raise revenue to pay governmental expenses; second, to protect American industry. As no rubber is grown in the United States there are no rubber growers to be protected and the entire tax must come out of the pockets of the ultimate consumers of rubber. The export tire business is growing and if the makers are obliged to pay a tariff tax they will be puzzled to compete with foreigners in foreign markets. If domestic business remains just as profitable as it was before there will be a sharp reduction in profits in export trade. The cost of tires is the chief expense of motoring and anything that would tend to increase it would have a tendency to check trade, lessen sales of automobiles and slow up business."

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Chain Makers Fight Tariff Decrease

A brief has been filed with the United States Senate Committee on Finance protesting against that section of the proposed tariff bill that deals with sprocket chains for automobiles. The Diamond Chain & Manufacturing Company submits the brief. The facts are set forth in it that steel suitable for this class of manufacture costs about one-third more here than it does abroad and that labor here is higher paid than it is in foreign countries. Taking 100 as a basis of American cost, it is figured that the foreign maker can produce at 55, which added to the present duty of 45 per cent. makes it possible to present it to the American trade at 79. If the margin for freight and profit comes to 30 per cent. these goods could be sold in New York at 103 at a profit, while the American manufacturer would be at a price disadvantage to compete.

The company urges the committee to raise the tariff rate on sprocket chains to 50 per cent. ad valorem.

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Goslin Bill May Change Maryland Law

BALTIMORE, MD., Feb. 26—Several important changes of interest to motorists generally will be made in the automobile law of Maryland if a bill just introduced into the legislature of that State by Senator Goslin becomes a law. A reciprocity provision has been incorporated in it granting absolute freedom to motorists of other states and territories to enter Maryland whenever they choose, remaining as long as they desire, where the same privilege is extended to Maryland automobilists by other states.

The bill changes the system of licensing pleasure cars providing for fees on basis of 75 cents per horsepower of each motor vehicle to be calculated in the same manner as provided in the present statute.

The enactment of this measure would eliminate the necessity of non-resident motorists securing the non-resident tag or marker from the Commissioner of Motor Vehicles, which, under the present law, permits residents of other states to tour in Maryland for two periods of 7 consecutive days in each year. While no fee is charged for th enon-resident tag, it makes it burdensome for automobilists desiring to tour in Maryland who must secure the tag in advance and affix it to the rear of the motor vehicle before entering the state.

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Automobile Demand Puts Up Hides

AUSTIN, TEX., Feb. 26—It is reported by hide dealers in Texas that the development of the automobile business has created a new and extensive demand for the higher grade hides of Texas cattle. These hides are used for manufacturing tops of the higher-priced cars. It is claimed that this new use to which hides are being put has caused them to advance materially in price.

Against Criminal Chauffeurs

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New York State Senator Proposes to Bar Criminals from Operating Automobiles Under Penalty

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Michigan Supreme Court Makes Owner Liable for Accident Whether Driving or Not

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ALBANY, N. Y., Feb. 26—State Senator Thomas H. Bussey, of Perry, N. Y., is the proposer of a bit of radical automobile legislation to prevent criminals from operating automobiles. The chief provision of his bill is a section that forbids the Secretary of State from licensing as a chauffeur any person who has ever been convicted of a crime. An affidavit shall be required of an applicant to the effect that no conviction stands against him, and in case he swears falsely he may go to prison for 5 years.

The reason for the bill lies in the fact that criminals have used cars with much success in perpetrating robberies and other crimes in New York city.

In speaking of the bill Senator Bussey said: "The use of the automobile has opened a new era of crime."

One of the leading members of the trade in New York voiced the following opinion: "The Bussey bill is unnecessary. If it would prevent lawlessness, nobody would find any fault with it. But the fact of the matter is the present law covers the point quite as fully as the Bussey measure could. In the first place the penal statute against perjury would not be strengthened by reasserting the palpable fact that if an applicant for a chauffeur's license swears falsely he shall be deemed guilty of perjury. In the second place, a known criminal could not get a license under the present laws no matter if it were to run a saloon or an automobile.

"The danger in the law is that while its aim may be directed toward the known criminals, its weight would be felt by a big fraction of the professional chauffeurs. It is a fact that very many holders of licenses are technically ex-convicts owing to the rigorous administration of the laws of this and other states in the early days of motoring.

"Practically every demonstrator for automobile sales agencies in New York has been arrested and convicted at least once for over-speeding when the laws provided a lower rate of speed than present laws declare. What was a misdemeanor under other laws is now legal procedure, but that does not alter the fact that a conviction or two may stand against a particular driver who has no more idea of violating the law than Senator Bussey."

"The trouble with the situation," said another member of the trade, "is that if it is true that known criminals are in possession of New York state licenses, the present law is not being strictly administered. The corrective measure would seem to require more and better administration of existing laws rather than more laws which may or may not be well administered."

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Holds Owner Liable for Damages

LANSING, MICH., Feb. 26—The Michigan Supreme Court in refusing to entertain the appeal entered in the case of Delos Johnson vs. Lewis Sergeant from the Kalamazoo Circuit Court by the defendant upholds the statute making the owner of an automobile liable for damages which might occur as the result of its operation, whether the operator is the owner or some other person.

The plaintiff in this case was an expressman who was run into by an automobile driven by George Sergeant, son of the defendant.

Brooklyn's Second Show

Several Cars on Exhibition Not Seen at Either Palace or Garden

Crawford, Ford and White Star Newcomers in the Commercial Section

BROOKLYN, Feb. 24—All Brooklyn turned out tonight to assist in the auspicious opening of the Second Annual Brooklyn Automobile Show, held under the auspices of the Brooklyn Motor Vehicle Dealers' Association at the Twenty-third Regiment Armory. It is estimated that there were nearly 9,000 people in attendance, and with this beginning, the dealers were jubilant over the prospect for the week.

Charles H. Green, who has long been a promoter of trade exhibitions, has the affair in charge, and the dealers' show committee consists of W. H. Kouwenhoven, chairman; J. D. Rourk, C. F. Batt, I. C. Kirkham and C. M. Bishop.

In the matter of decorations, arrangement of space and general appearance the exhibition is in advance of last year's maiden attempt. The decorations are along the Spanish order, and the crimson and white bunting which has been used unsparingly transforms the large hall into a fitting show space for the eighty-two makes of pleasure and commercial cars.

The floor space has been well laid out so that it is not necessary to take a circuitous route to reach any of the exhibits. The space is cut up into eight blocks, each of which has been so divided as to make room for eight exhibitors. Along the front and rear ends there are ten more car dealers, while the sides of the building are given over to the twenty-five exhibitors of accessories, many of whom are Brooklyn manufacturers.

The exhibition is by no means confined to the pleasure car class. Several of the makers who manufacture commercial vehicles as well have both types on show. Among these are the Packard, Alco and Ford.

There are fifty-eight makes of pleasure cars for the prospective buyer to examine—all of the gasoline variety except the Detroit electric. Of these, eight were not to be seen this year at either the Palace or the Garden. The cars making their debut are the Apperson, Autocar, Case, Cino, Ford, KisselKar, Norwalk, and Pathfinder. Among the twenty-two commercials which are here for the inspection of the merchant are three makes which are showing for the first time this season in Greater New York. These are the Crawford, Ford and White Star. Perhaps the most notable addition to the list is the Ford. It has always been the custom of the Ford company to hold a private show at its salesrooms at the same time that the large exhibitions were being held, but this year it appears under the same roof with its contemporaries. At the large national affairs at New York and Chicago this year, Ford cars were attractively displayed at the sales branches.

No radically different features of construction are in evidence at the Brooklyn gathering and the fine examples of body work on both the pleasure vehicles and the trucks, the elaborately finished show chassis and the variety of latest designs remind the visitor of the recent national exhibitions at the Palace and the Garden in New York and at the Coliseum in Chicago.

Show Is a Dealer-to-Buyer Proposition

THIS show, following as it does so closely on the heels of the national affairs, does not aim to merely bring the various makes of cars before the Long Island public, but to sell the machines which have created favorable impressions in the minds of the prospects at the larger and earlier exhibitions. In a word, it is a dealer-to-buyer proposition, and differs from these others in that the exhibitor, since in this case he is the dealer and not the manufacturer of the machines which he is showing, desires to get at the ultimate buyer.

At the national shows the maker who was showing his product was perhaps more keenly interested in making an impression on the prospective dealer than on the individual who was in the market for a single car.

General view of the interior of Twenty-third Regiment Armory, where the Brooklyn Show is now in progress

Another reason given is that the New York shows are more of a display character, where the manufacturers first present their products to the public, but where the buying is comparatively limited as compared with that of the shows later in the season. If conclusions may be drawn from appearances of things on the first night, this year's exhibition will at least rival last year's effort as a selling enterprise.

To cite specific instances, the New York branch of the Rambler company has taken the central space of the entire entrance hall, where the complete Jeffery line is displayed. According to the representative of the company, one of the cars on view was sold 25 minutes after the show had opened. Doings at the space of other dealers in medium-priced cars such as the Paige-Detroit, Pathfinder, Buick, etc., indicated real business. The agents handling high-class cars also found the opening night satisfactory in this respect.

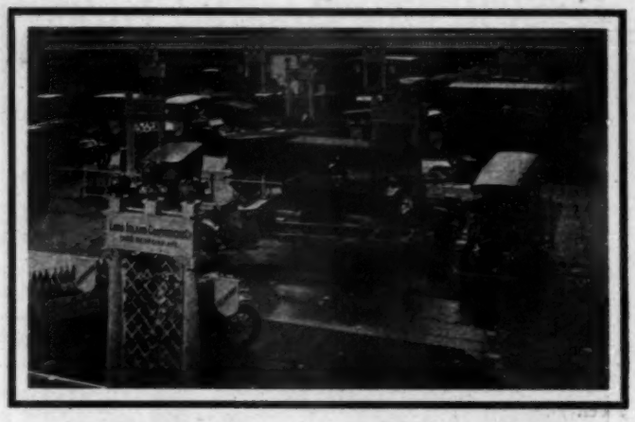
The fact that pleasure and commercial cars of the same company are shown in the same space helps greatly to have every visitor see everything on view. By this arrangement visitors become acquainted not only with pleasure cars and their dealers, but with the representatives of truck makers as well.

Furthermore, while the show is a local one in a certain sense, it is of considerable importance for a comparatively large territory.

Show Promises to Be a Selling Success

Although some dealers represent their factories to Brooklynites only, the activity of the majority covers a larger field. A number of dealers are metropolitan or even Eastern agents, with headquarters in Manhattan and a branch in Brooklyn; others conduct all their business from Manhattan, yet supply the whole State of New York, and sometimes Connecticut as well. Most exhibitors have Long Island included in their territory, and as it is a good touring ground, this territory alone would suffice to make the show a successful one. But in addition to the people coming from Long Island there are quite a number of New Yorkers who, having seen both shows at Manhattan without a final decision, come to Brooklyn to be translated from prospectives into buyers.

While there are possibly 10,000 machines owned in Brooklyn



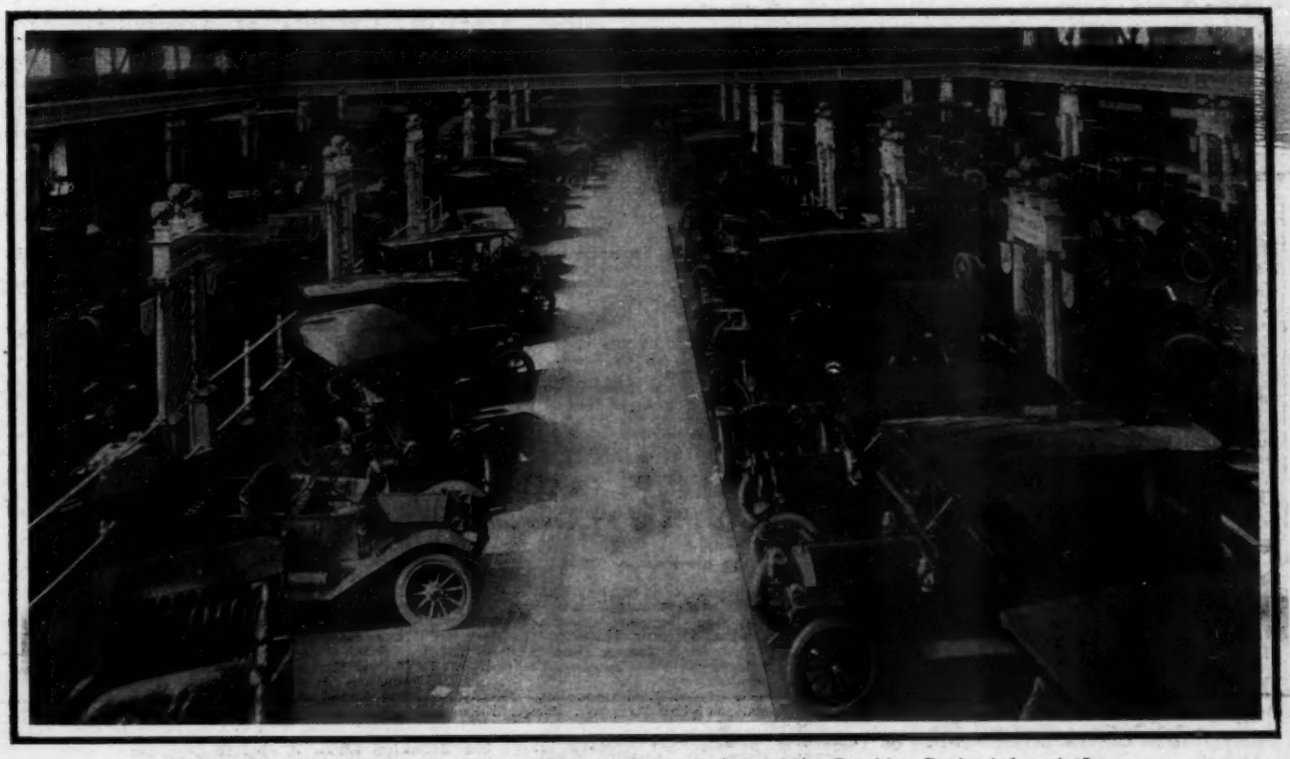
A corner where some of the commercials congregated

at the present time, it is probable that within the next few weeks many more will be added to the list, and the show committee has chosen the present time as being the most auspicious for business, the automobile buying public being now at the beginning of the season in its most receptive mood and can be most easily reached.

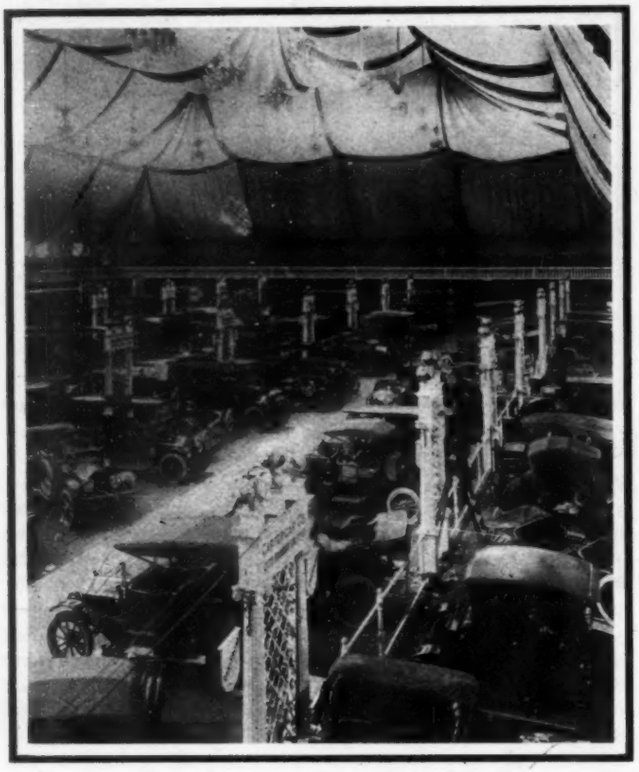
There are nearly 2,000,000 people in the city and a large percentage of them are able financially to own automobiles. This year the Brooklyn dealers are aiming more than ever to reach this class and they feel that as a business getter the show will be unparalleled.

Another phase of the situation which appeals to the Brooklyn dealer is that Long Island in its entirety is interconnected by very fine roads and these in addition to the beauty of the island make touring doubly attractive. There is a strong tendency for the further interlinking of the entire community, and with this the automobile will play an ever larger part.

Recognizing the importance of Brooklyn as a field for accessories, a good many makers of this section show their products at the Armory, who have not exhibited either at the Garden or Palace. These include the Mechanical Rubber Tire Com-



Looking down the long center aisle at the second annual show of the Brooklyn Dealers' Association



The decorations in the Armory were very effective

pany, of 354 Cumberland street, Brooklyn, maker of the Giant tire. The Giant casing is manufactured by a special process of winding strips of fabric around moulds, frictioning the layers together and then splitting the cylindrical casing at its inner circumference and tucking the edges to the sides. This gives a uniform tension all through the material.

Two Brooklyn makers of batteries exhibited, of which the Lincoln Electric Company manufactures the Hi-Po waterproof dry cell, and Paul M. Marko & Company a storage battery for lighting and ignition service.

The Pioneer Auto Top Company and the Brooklyn Auto Top Company, Incorporated, showed their tops and windshields, and the Trautman Tire Company exhibited its tire, made in Brooklyn, and which contains air, but not in an inflated tube. The air is forced into the pores of the soft rubber in the process of manufacture, resulting in a material which is composed of soft rubber penetrated by numerous thin guideways filled with air. The rubber is vulcanized to a certain degree of resistance, but it is live when it is made into the tire and remains so for a long time.

The Schaap Automobile Company, also a Brooklyn concern, showed materials welded by their city-gas and compressed-air welding method. The process comprises the use of a specially constructed Bunsen torch which is connected to the gas line and to a compressed-air tank, giving a highly active soldering flame.

The Pyrene Manufacturing Company, of New York City, showed its extinguishers filled with Pyrene, a liquid which evaporates at 200 degrees Fahrenheit and stifles any flame it contacts with. The liquid or gas does not conduct electricity, is not decomposed in the course of time, and contains no acid, alkali or moisture, but evaporates entirely if poured on any material. It is considerably heavier than water, with which it does not mix, and freezes at about 100 degrees below zero.

Packings and brake facings made by the H. W. Johns-Manville Company were exhibited at the stand of the Martin-Evans Company, of 1186 Bedford avenue, Brooklyn.

In addition to these products a number of accessories shown at the Garden and Palace were on display at the show, filling all the space on the ground floor around the walls.

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Atlanta's Show Attracted 25,000

ATLANTA, GA., Feb. 24—The agents and dealers who took part in the recent Atlanta show, financing it in advance, will get a 35 per cent. rebate. The Automobile and Accessory Dealers' Association will give Manager Homer George a banquet as a special recognition of his good work.

The official estimate is that 25,000 people saw the Atlanta show, and a remarkable fact about the entertainment was that most of the visitors at the show were people who live outside of Atlanta. Plans are being made now to run next year's show in November in order to have it well ahead of the buying season.

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Acre of Exhibits at Louisville

LOUISVILLE, KY., Feb. 26—Present indications point to over fifty exhibits at the Louisville Automobile Dealers' Association show on March 6-9. The big floor of the First Regiment Armory covers exactly 1 acre. The booths will be separated by an iron fence, 6 feet in height, resting on a stone wall.

LIST OF EXHIBITORS AT THE SECOND ANNUAL SHOW OF THE BROOKLYN AUTOMOBILE DEALERS' ASSOCIATION

Pleasure Cars

I. M. Allen Company, Stevens-Duryea.
American Locomotive Company, Alco.
L. J. Bergdoll Motor Company, Bergdoll.
A. W. Blanchard, Ind., Case and Fiat.
Bishop, McCormick & Bishop, Cole and Ford.
Bruns Automobile Company, Chalmers.
Buick Motor Car Company, Buick.
Cartercar Company, Cartercar.
Carpenter Motor Vehicle Company, Studebaker and E-M-F.
Central Motor Company, Otto and R. C. H.
Cumberland Garage, Speedwell and Velie.
Detroit-Cadillac Motor Car Company, Cadillac.
Detroit Electric Car Company, Detroit Electric.
A. Elliott-Ranney Company, Hudson.
Elmore Sales Company, Elmore.
Empire City Auto Company, Paige-Detroit and Warren.
Farrel Auto Company, Apperson.
Franklin Automobile Company, Franklin.
Grant Square Auto Company, Cino.
Jackson Auto Sales Company, Jackson.
Jos. B. Jeffery Company of New York, Rambler.
I. C. Kirkham, Columbia and Maxwell.
Lyon Auto Sales Company, Lion.
Marion Motor Car Company, American and Marion.
Mitchell Motor Company, Mitchell.
Montauk Garage, Pope-Hartford.
Ormond Motor Car Company, Kisselkar.
R. M. Owen Company, Premier and Reo.
Packard Motor Car Company of New York, Packard.
Parry Auto Sales Company, Pathfinder.
Pastries Auto Garage, Firestone-Columbus.
Peerless Motor Car Company, Peerless.
Penn Motor Car Company, Penn.
Poertner Motor Car Company, National and Herreshoff.
E. F. Rau, Krit.
I. S. Remsen Mfg. Company, Locomobile.
Regal Automobile Company, Regal.
J. D. Rourk, Haynes.
Sterling Place Garage & Sales Company, Norwalk.
Stoddard Motor Company of New York, Stoddard-Dayton.
C. T. Silver, Overland.
F. B. Stearns Company of New York, Stearns-Knight.
Thomas Motor Company of New York, Thomas.
M. J. Wolf, Autocar and Hupmobile and Knox.
White Motor Car Company, White.
Woods Automobile Garage & Sales Company, Oakland.

Commercial Cars

American Locomotive Company, Alco.
Buick Motor Car Company, Buick.
Bruns Automobile Company, Durable Dayton.
E. D. Boldman, Decatur Hoosier.
Bishop, McCormick & Bishop, Ford.
Carpenter Motor Vehicle Company, Garford.
Farrell Auto Company, Cass.
Hexter Motor Company, Gramm.
Lewis Commercial Car Company, Poss and Knickerbocker.
Montauk Garage, Pope-Hartford.
Ormond Motor Car Company, Kisselkar.
ard.
Packard Motor Car Company of N. Y., Packard.
Peerless Motor Car Company, Peerless.
Prospect Park Square Garage and Sales Company, Crawford.
New York Auto Wagon Company, Brooks.
Sterling Place Garage & Sales Company, Lippard-Stewart.
Universal Truck Company, Universal.
M. J. Wolf, Autocar and Knox.
Wyckoff, Church & Partridge, Inc., Commer.

Accessories

Julius Bindrum.
Brooklyn Auto Top Company.
Buckley and Rodger.
C. T. Cross & Company.
G. O. Graves.
Golde Patent Manufacturing Company.
Henry Manufacturing Company.
Hercules Waterproofing Company.
Martin, Evans & Company.
Paul M. Marko & Company.
Charles E. Miller.
Mechanical Rubber Tire Company.
Mugget Polish Company.
Newmastic Tire Company.
O-Tak-A Tire Company.
Pyrene Manufacturing Company.
Pioneer Auto Top Company.
Regemhard & Stanley.
Schaap Auto Company.
George Sumner, Inc.
Trautmann Tire Company.
John H. Taylor Company.
Wenz-Ludy Equipment Company.

Trucks Feature at Baltimore

Twenty-eight Makes Exploited, with Fifty-one Pleasure Cars

BALTIMORE, MD., Feb. 26—Both from the standpoint of sales and attendance the 1912 motor car show promises to be the biggest thing as a whole in the exhibition line ever held in the Monumental City.

The commercial section is really the big feature of the 1912 show as it is the first time in the history of the city that exclusive dates have been arranged for the exhibit of motor vehicles for business purposes.

There are twenty-two commercial firms that have exhibits and they represent twenty-eight makes of cars. These range from the 1,500-pound delivery wagons to the big trucks of 5-ton capacity or more.

During the past week, from the opening night on Tuesday until Saturday night, the pleasure car exhibit was held and brought out thousands of admirers. The result was that many sales were reported, while a number of the local representatives of the various firms stated that quite a few sub-agencies were placed throughout the state. Many of the purchases were made by farmers and persons from sections outside of Baltimore, as well as by Baltimoreans themselves. While the sales of small and medium-priced cars seems to have been more numerous, the dealers of large cars have also made some flattering reports which tend to show that these cars are also popular in this city and surrounding sections for pleasure purposes.

There were fifty-one makes of pleasure cars shown, while the total number of exhibitors was thirty-six. Among the new cars, from a Baltimore standpoint, were the De Tamble, Detroit-Electric, Everitt, Fiat, Seitz, Elmore, Lincoln, Simplex, R. C. H., Paige-Detroit, Guy Vaughn, Columbia, Abbott-Detroit and Cole. In the commercial cars there are the Morgan, Chase, Board, Saurer, Federal, Commer, Everitt, Pierce-Arrow, Lozier, Seitz, Elmore, Lincoln, Peerless and Chalmers. There are twenty-eight accessories and supply exhibitors.

The list of exhibitors follows:

Automobiles—Auto Outing Company, Buick; H. H. Babcock Company, Babcock; Callahan Brothers Company, De Tamble; Callahan, Atkinson & Company, Locomobile; Cooper & Sinclair, Moon; J. S. Ditch & Company, Detroit-Electric; Everitt Auto Company of Maryland, Everitt; Ford Auto Company, Ford; Franklin Auto Company, Franklin; Foss-Hughes Company; Pierce-Arrow; Lambert Automobile Company, Hudson, National; Lozier Sales Company, Lozier; F. C. Latrobe, Fiat; Mar-Del Mobile Company, Packard; Motor Car Company, Stevens-Duryea, Overland; Mount Vernon Motor Company, Kissel; C. R. Misner, Oldsmobile; Model Automobile Company, Pullman; Neely & Ensor, Kline, Alco; Norwood Brothers, Inc., Seitz, Elmore, Lincoln; Oakland Motor Company, Oakland, Thomas; G. A. Pope, Jr., Simplex; the Rice Brothers Garage, S. G. V., Rauch & Lang; F. W. Sandruck, American, Moline; Shaffer Manufacturing Company, R. C. H.; Schall & Crouch Auto Company, Paige-Detroit; George R. Snodeal, Guy Vaughn; Standard Motor Company, Cadillac; Stoddard-Dayton Auto Company of Baltimore, Stoddard-Dayton; Walter Scott, Marmon, Crawford; Carl Spoerer's Sons Company, Spoerer; L. M. Vordemberge Motor Company, Maxwell, Columbia; White Automobile Company, White, Abbott-Detroit; Winton Motor Car Company, Winton-Six; D. C. Walker Auto Company, Stearns, Cole, E-M-F, Flanders; Zell Motor Car Company, Peerless, Chalmers.

Commercial Cars.—Atterbury Motor Company of Maryland, Atterbury; Callahan Brothers Company, Morgan; Chase Motor Truck Company, Chase; Consolidated Gas, Electric Light & Power Company, Electric Company wagons; Enterprise Fuel Company, Gramm; Everitt Auto Company, Everitt and Board; Ford Auto Company, Ford; Foss-Hughes Company, Pierce-Arrow; International Harvester Company of America, International; International Motor Company, Mack and Saurer; the Kelly Motor Truck Company, Kelly; Lozier Sales Company, Lozier; Mar-Del Mobile Company, Packard; Mount Vernon Motor Company, Autocar; Neely & Ensor, Kline and Alco; Norwood Brothers, Inc., Seitz, Elmore and Lincoln; Oakland Motor Company, Federal; George R. Snodeal, Commer; Standard Motor Company, Cadillac; Stoddard-Dayton Auto Company of Baltimore, Sampson; White Automobile Company, White; Zell Motor Car Company, Peerless and Chalmers.

Accessories and Supplies—Auto Supply Company, Automobile College, Auto Company of Maryland, Baltimore Buggy Top Company, Baltimore, American, Chase Motor Company, Callahan Brothers Company, George R. Curtis, Carbolide Chemical Company, W. H. L. Casho, Charles Elliott & Company, the Elastic Wheel Company, Howard A. French & Company, Thomas J. Gallagher, F. Hemmeter & Sons, Indian Refining Company, of New York; H. W. Johns-Manville Company, Keystone Lubricating Company (auto department), F. C. Latrobe, Maryland Electrical Supply Company, Maryland Motorcar Insurance Company, *The News*, Pyrene Manufacturing Company, Randall Manufacturing Company, John C. Raum & Son, *The Sun*, F. W. Sandruck, Southwestern Surety Insurance Company, Standard Oil Company (care of J. W. Sayboldt), R. W. Thompson and Little Joe Wiesenfeld Company.

Busy at New Orleans Show

Big Crowds of Visitors Necessitate More Demonstrators

NEW ORLEANS, Feb. 24—With all the enthusiasm that characterized the participation in the Mardi Gras festivities, the crowds have turned their attention to the motor show now in progress.

The show had not been open an hour Wednesday until the exhibitors were drafting additional demonstrators from their salesrooms. Each demonstrator had many more opportunities to explain the merits of his car than it was physically possible for him to accept.

In addition to the cars, many tastily arranged accessories have been grouped in artistically decorated booths.

There are thirty separate exhibits in the Armory, occupying forty of the space units into which the Armory is divided.

The Abbot Auto Company is featuring a Packard six phaeton, a Baker electric and a 3-ton Packard truck chassis. Attention is being concentrated on the Knox motor at the booth of the Demack Motor Car Company.

One of the several cars sent here from the New York show is a Pierce-Arrow six-cylinder five-passenger touring car. An effort is being made at the Chalmers booth to have every visitor see the new self-starter in operation. All seem to be interested in this device and the crowd continually around it is a testimonial to the interest that is following this development.

Three lighting systems in operation are being shown on the Corbin limousine. Electricity and two gas systems are installed in this exhibit car in order that prospective purchasers may judge for themselves as to the best method of illumination. The R. C. H. exhibit is being shown in the same booth.

Three designs of Hudsons are displayed by J. M. Johnson, who also is the representative of the General Electric truck, which shares the space in his exhibit. The Thomas flyer also forms part of the display.

A four-cylinder touring car, which has been stripped to show the workings of the engine, is the feature of the Ford display. Two Stevens-Duryea and a Haynes touring car make up the exhibit of H. A. Testard. Merril T. White, from the Stevens-Duryea, factory, is in personal charge.

A 43-horsepower, five-passenger touring car and a Buick runabout form the basis of some well-worded arguments as to the value of this company's production. Joseph Schwartz & Company is the local agent. The same company is displaying a 3 1-2-ton Reliance truck.

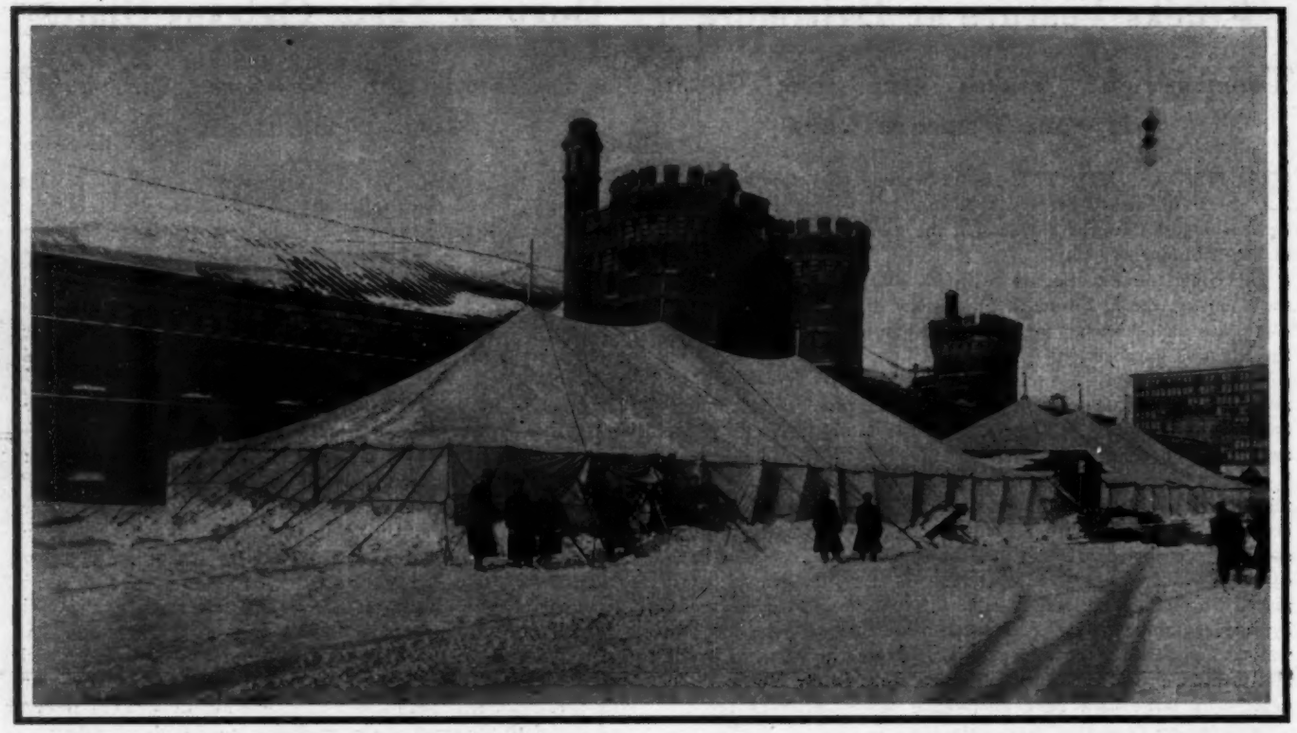
A special car was sent from the factory as the headliner in the Locomobile exhibit. The Little Six is being demonstrated ably by Marion W. Colcock, Jr., a special representative from the factory.

Rear axle transmission and the oiling system are two points in which the Marmon demonstrators claim special superiority. The display is under the direction of the Myatt Dicks Motor Company, which also shows a Stoddard-Knight.

On the stripped chassis of the De Tamble roadster, the C. A. Tessier trophy recalls the Memphis-New Orleans race, in which this car was victor. A 38-horsepower Rambler roadster and a big touring car are being shown in the space held by A. S White, the local agent.

The Peerless, Pathfinder, Overland, Winston, Paige-Detroit, Alco, Flanders, E-M-F, Garford, Thomas, Oakland, Cadillac. Chase, Gramm, Fairchild, Bowling Green and White cars are attracting much the same attention as the other cars mentioned.

The results from the show began showing early after the opening. One of the surprises is the number of orders that have been placed by persons from out of town, demonstrating the wisdom of the management in scheduling the show to follow the Mardi Gras, when the city is crowded with visitors.



Space was so scarce at the Toronto Show that huge tents had to be requisitioned to accommodate exhibitors

Toronto Opens in Storm

American Cars Form Bulk of Exhibits at Canadian Metropolis

Rival Show Held in The Arena Was Spoiled by Storm Delaying Most of the Exhibits

TORONTO, CAN., Feb. 24—Despite the worst storm of the winter, the big show in the Armouries, held under the auspices of the Toronto Automobile Trade Dealers' Association, was formally opened by Sir John Gibson, lieutenant-governor of Ontario, in the presence of about a thousand leading citizens and exhibitors. The show in the St. Lawrence Arena did not open until Thursday night on account of the hold-up of some thirty-odd cars at the border through some customs technicality being overlooked.

In the Armouries there are forty-five exhibitors of cars of the pleasure and commercial types. The stately limousine and the gorgeously fitted brougham rub hubs with commercial and fire trucks. Seventy-six makes are represented, of which fifty-six are American, eighteen Canadian, one English and one Italian. The English car is the Wolseley, of which three models are shown. The lonely Italian car is a Fiat. The exhibit is arranged in four rows in the main floor, in three rows in the riding school and in two in the double tent annex, which finally became necessary to substitute for the steel shed designed to accommodate the overflow. It is the largest exhibition of motor cars ever made in Canada.

A very large proportion of the pleasure cars are equipped with one or another of the self-starting devices. This appears to catch the fancy of the Canadian automobile enthusiast, and so many of the makes exhibited which have installed the self-starter as one of the items in their complete equipment have open chassis on exhibition displaying their type of starter that most prospective buyers take a surreptitious look at an attractive car, to see if it has an exposed crank before asking any questions. The tendency is toward the touring car and the roadster, types which are especially suitable for the country roads around about Toronto; but there is an increasing call for electric broughams, coupés and phaetons for physicians and feminine enthusiasts of taste and wealth.

On the second day there were 3,000 persons at the Armouries. The attendance increased on Friday to 5,000, and with a moderation of the weather today the number which will pass through the turnstiles before the show closes tonight will far exceed the figures of yesterday. And the show has three days more to run.

Not many sales are reported. The inquiries lead to the presumption that this feature of the show will have a satisfactory conclusion during the later days of the exhibition, for there are still many cars destined for the show detained en route by the blizzard, and the prospective buyer is waiting until the exhibit is complete before he makes his selection.

Society Much Interested In Show

Thursday night was Ontario Motor League Night, when the members brought their women friends and entertained them in the messroom of the Armouries. Saturday night was Military Night and there was a royal turnout of officers and members of the various regiments and units composing the local garrison. Next Tuesday will be Society Night, when it is expected that the attendance will very largely exceed the limits of comfortable accommodation in the big building and its annexes.

Much interest was taken by business men in a 1,500-pound truck exhibited by the Brantford (Ont.) Motor Truck Company.

The first car sold at the show was a De Luxe model Hupp-Yeats electric ladies' brougham. This car is very richly upholstered, trimmed with gold and mother-of-pearl, and equipped with every little accessory that ingenuity could devise for the comfort and enjoyment of milady while making her social rounds.

The list of exhibitors and of the cars exhibited is as follows:

Automobiles—Dominion Automobile Company, Peerless, Hudson, Stevens-Duryea and Napier; McLaughlin Motor Car Company, McLaughlin-Buick, Rausch & Lang, and Fiat; Russell Motor Car Company, Russell; Gibson Electrics, Limited, Hupp-Yeats; White Company, Limited, White; E. M. F. Company, E. M. F. and Flanders; Ontario Motor Car Company, Packard and Detroit electric; Automobile Supply Company, Limited, Pierce Arrow, Hupmobile, Reo and Stoddard-Dayton; Ford Motor Com-

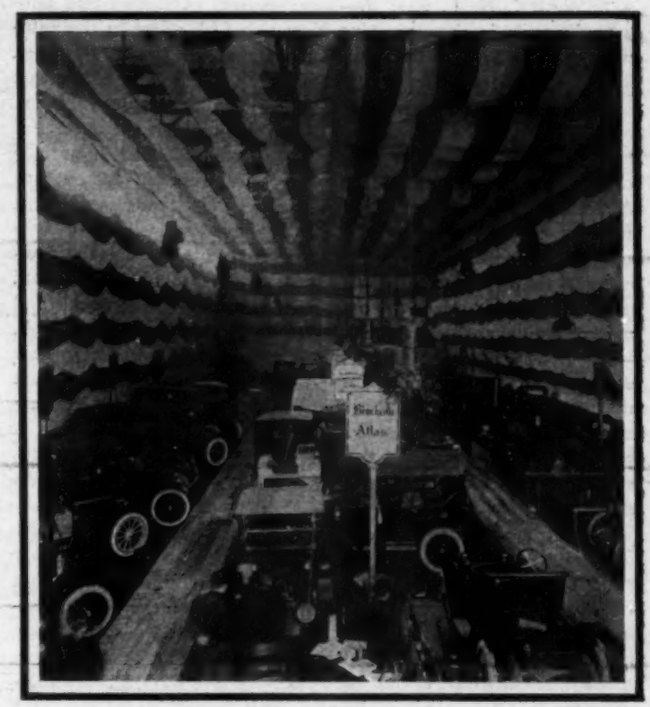
pany of Canada, Ford; Hyslop Bros., Cadillac; Kissel Kar Sales Company, Limited, Kissel; Imperial Motor Car Company, Oakland and Oldsmobile; Tudhope Motor Car Company, Tudhope; Schacht Motor Car Company of Canada, Schacht; Warburton Bros., Maxwell and Inter-State; Wolseley Petpot, Wolseley; T. Eaton Company, Limited, Chalmers, Lozier, Waverley, Saurer; Shaw-Overland Sales Company Overland, Carford and Gramm; Jones & Glassco, Fodens; Watson Carriage Company, Watson; Abbott-Detroit, Abbott-Detroit; E. A. Greene Company, Ward; Brantford Motor Truck Company, Brantford; Baker Bros. Motor Company, Cole; White American Sales Company, American Underslung; Northern Motors, Limited, Paige-Detroit; Rambler Motor Car Sales, Rambler; J. I. Case Company, Case; Motor Car Supplies, Velie; Petrolia Motor Car Company, Petrolia truck; Riverdale Garage and Rubber Company, Lion; Virtue Motor Sales Company, R. C. H.; Peck Electric, Limited, Peck; Clinton Motor Car Company, Clinton; Graydon-McCulloch Company, Kelly fire truck; Automobile Sales, Limited, Colonial; Mitchell and Moon; Brockville Auto Company, Limited, Atlas; oMntreal Locomotive Works, Alco; Pope-Hartford Motor Company, Pope-Hartford, Straker-Squire; Gordon Myles & Company, Krit, Flanders electric; A. E. Wilson, Jackson; New Dominion Motors, Limited, Queen; International Harvester Company, trucks.

Accessories—Leather Tire Goods Company, tires; Gutta Percha Rubber Company, Fisk tires; Queen City Oil Company, lubricants; Croftan Storage Battery Company, Canadian Consolidated Rubber Company, tires; Auto Tire Company, Goodrich tires; S. F. Bowser & Company, gasoline and oil storage systems; Dunlop Tire Company, Russell Motor Car Company, Goodyear Tire and Rubber Company, Canadian Carbon Company, Limited, batteries; Bosch Magneto Company, Independent Tire Company, Limited, Death & Watson, storage batteries; Marburg Brothers, magnetos; Electric Specialties Limited, miscellaneous; John Millen & Son, magneto; Canadian National Carbon Company, batteries; Pollock Manufacturing Company, lamps; Hay's Manufacturing Company, brass polishes; J. P. Holden Rubber Company, tires; Consolidated Rubber Tire Company, Cleveland Hardware Company, parts; Gasolock Dominion Specialty Company, Pearce Brothers, metal polishes; Hall Motor Supplies, S. W. Black, garage wall board; Warner Instrument Company, meters, etc.; Williard Storage Battery Company.

Rival Show in St. Lawrence Arena

TORONTO, CAN., Feb. 24—Although every foot of the 20,000 square feet of space in the St. Lawrence Arena was sold for the rival automobile show there on the same dates as the larger show in the Armories here, there were not more than a dozen exhibits in place up to tonight, and two, at least, of those installed will be removed to squeeze-in spaces at the Armories on Monday. Others would go if they could be accommodated in the big show, but they cannot. The opening of the show did not take place on Wednesday night as scheduled, but was a perfunctory feature of Thursday night. The attendance has been equally disappointing. Yesterday, with pleasant weather, the attendance was less than 300, of which 127 were paid admissions. The railways reported the arrival of a number of belated cars this afternoon, and these will be in place early on Monday morning.

Arrangements are practically completed for the extension of this show until next Saturday night. As the Armories show closes on Wednesday night, this would give the Arena management a chance to give their exhibitors a little better value for their money in the larger attendance that will naturally flow to this show when the greater attraction is withdrawn.



Annex where a portion of the exhibits were installed

Interior of The Armouries, where the big Toronto Show was held, showing the artistic roof decorations and huge crown

Big Retail Sales at Newark

Show Just Closed Saw 125 Cars Disposed of—Value $200,000

NEWARK, N. J., Feb. 26—Management, exhibitors and public unite in characterizing Newark's fifth effort in the automobile show field as by far the most successful of the quintet. This city's nearness to New York would seem to indicate that a show held so close to the shadow of Madison Square Garden must of necessity be restricted to the city of Newark alone and be doomed to mediocrity by that very fact. But such is not the case. The dealers in northern Jersey and from as far south as Atlantic City flocked to Newark last week and made their plans for the coming twelvemonth. Not a few agencies and subagencies were placed; these were especially noted among the newcomers to this territory, such as the Moline, the Penn and others. Makers of accessories were on hand all week, and many arrangements for local representation were put through.

But it was from the direct sales angle that the show's success was particularly brilliant. THE AUTOMOBILE representative took the trouble of directly questioning every exhibitor, and making allowances for the enthusiasm naturally to be expected after a remarkably successful business week, the total number of cars sold aggregates close to 125, representing a value of close to $200,000.

A few instances will serve to indicate that no particular class of cars was the beneficiary of the demands on Newark show exhibitors last week. While the Abbott-Detroit representatives recorded eight sales during the seven days, the Pierce-Arrow exhibitors trailed along with five. With the Hudson order book indicating nine sales for the week, the Locomobile agents recorded an even half dozen. Mrs. Rickey, the only woman handling a car agency in the state of New Jersey, closed up three actual sales and banked the deposit money. The Haynes contingent point to seven cars placed as a result of the week's work at the show, while the Overland squad landed five purchasers. And so on all along the line.

The commercial exhibitors, while hardly as enthusiastic as the pleasure car men over the results of the show, are apparently quite satisfied. Sales of several Garford, Buick, Flanders and other commercial cars were recorded, while the number of first-class prospects on the books presages many additional orders for all the exhibitors of business wagons.

In the matter of prospective sales of pleasure cars, the quickening effect of Newark's show will be felt for months to come. Beginning today, every demonstrating car in Newark will be busy adding converts to automobiling. Indeed, despite the surprising results from actual sales, the "prospect" feature of last week's show is looked upon by many of the exhibitors as its greatest work. The moneyed people from the Oranges, the Montclairs and from districts farther away were attracted to the armory, and, having given evidences of seeing the light, were promptly entered on the books by the attendants. This prospective business was helped along greatly by the show management's low-rate tickets to exhibitors. These were disposed of, and used, to the number of many thousands; indeed, Manager Bonnell stated that a goodly proportion of the nearly 25,000 admissions during the week were made up of this class of prospectives who were furnished with tickets by the exhibitors.

In the general chorus of praise consequent upon the phenomenal business of the week, the management came in for but few criticisms. One of them, however, is worthy of being noted here, and that is the early date of the show. There are not a few of the exhibitors who believe that it is a mistake to schedule the annual exhibition for a week when it is quite possible for a hangover blizzard to negative in large measure the results of the show. These exhibitors think that the ideal time for a local show is just before the warm weather is to be expected, say about the last week in March, or a trifle earlier. Opponents of this idea, however, come back with the statement that in the event of an early spring, a portion of the hoped-for harvest may be gathered by New York dealers.

A curious fact developed as a result of the round-up of the exhibitors by THE AUTOMOBILE representative, and that is that two-thirds of the business done by Newark's branch houses and agencies is from outside the city limits, and that the proportion of money involved is even greater. This is due to the fact that about every establishment in Newark has a territory which extends possibly to the northern boundary of the state, and as far West in some instances as the Delaware River. In this territory is included some of the most desirable residential neighborhoods in the United States; it contains the homes of hosts of moneyed men who do business in and around the metropolis of the nation. They it is who have made Newark's annual automobile show one of the best in the country from the viewpoint of actual sales of cars.

News of Coming Local Shows

DES MOINES, IA., Feb. 26—All is in readiness for the third annual show of the Des Moines Automobile Dealers' Association at the Coliseum, which opens March 4, for a run of one week. Twenty-seven thousand feet of floor space has been reserved by the local dealers and jobbers and 125 makers of cars will be shown.

CHARLOTTE, N. C., Feb. 26—The first automobile show ever held in the Carolinas will take place in the Auditorium in this city, February 26-28. Twenty makes of cars will be exhibited besides two or three lines of electric cars and a score or more of accessories. In the past year there has been an increase of 150 per cent. or more in the volume of automobile business handled through Charlotte as a distributing point of the two Carolinas. There are today more than 4,000 cars in North Carolina alone, where a year ago there were less than 2,500 machines. On October 25, 1911, there were 3,666 cars in operation in the state.

INDIANAPOLIS, IND., Feb. 26—A contract has been let by the Indianapolis Automobile Trade Association for the tent in which the motor car show will be held here March 23 to 30, inclusive. The contract calls for three tents, two main entrances and two connecting entrances. The tents are to be erected around three sides of University Park.

COLUMBUS, O., Feb. 26—According to the statement given out by the committee on arrangements about 125 cars will be on exhibit at the annual Columbus Automobile Show to be held in the old Federal Building, Columbus, for a week beginning March 2. Everything points to the largest show ever held in the Buckeye capital.

MUNCIE, IND., Feb. 26—A motor car show will be held in the Auditorium March 13, 14, 15 and 16, under the auspices of the motor car dealers and manufacturers of the city. There are two motor car factories, a number of dealers and four factories for the manufacture of motor parts in Muncie. The show will be the first of its kind ever held in the city.

SYRACUSE, N. Y., Feb. 24—Cars totaling in value almost a half-million dollars, with accessories worth $100,000 more, will feature the Syracuse Automobile Show, March 12 to 16, in the Armory and the building secured for the overflow space, the Alhambra. Applications for space are still coming in.

OSWEGO, N. Y., Feb. 24—P. R. Keating and Manager Lachlan Macleay, of the development bureau of the Chamber of Commerce, plan to hold an Oswego automobile show in Company D's Armory the second week in April.

MADISON, WIS., Feb. 26—The recently organized Madison Automobile Dealers' Association will hold its first annual show in the New Market Building, March 5 and 6. At least twenty-five makes of pleasure cars and motor trucks will be shown during the two days.

New England's Clubs and Associations

Organization Has Done Much in Furthering the Improvement of Automobiling Conditions in the Six States

AUTOMOBILE development in New England has been fostered largely by the numerous automobile clubs and organizations which have marked the progress of the industry in that section from the earliest times.

Ten years ago this month, when the American Automobile Association was formed, one of the leading elements in that body was the Automobile Club of Rhode Island, an aggregation of wealthy motorists most of whom lived part of the year at least, at Newport, but who were also associated with metropolitan activities.

An offshoot of this club staged the first real race meeting ever held in New England on August 30, 1901. The subordinate body was termed the Newport Automobile Racing Association and under its auspices a series of speed events was held for all kinds of power-propelled vehicles. There were races for tricycles and two-wheelers; electric vehicles, steamers as well as gasoline cars. The fastest time was made by William K. Vanderbilt, Jr.'s Cannstadt-Daimler, Red-Devil, a $20,000 automobile developing 45 horsepower, which turned 5 miles in 7:36 3-4 in the final heat.

Prior to the Newport races there had been numerous unofficial speed meetings and private matches, but the Newport races were chronicled at the time as being quite the most successful ever held on American soil up to that date.

The earliest form of sport of an organized character in New England was the club run. Of these all the pioneer clubs held several. However, where they were not unofficial road races they proved to be simple pleasure rides, the rules being in such a chaotic state at that period that anything like an accurate basis of competition was impossible except that of speed.

Hill-climbing came later, and it was not until the ascent of Dead Horse Hill, near Worcester, was made under the auspices of the Worcester Automobile Club that this branch of the sport reached a satisfactory stage of development.

The initial climb was held May 25, 1905, when twelve contests were held. A Napier won the free-for-all over the 1-mile course in 1:12 3-5, driven by W. L. Hilliard.

Since that meeting the Dead Horse climb has been repeated annually and has assumed a position of national importance among the Eastern automobile contests.

The first reliability run of real import was conducted from New York to Boston and return October 9 to 15, 1902, in which eighty entries were made and seventy-five cars actually started.

The Massachusetts Automobile Club, of Boston, acted as host for the tourists and at every control between New York and Boston the local club received the column and acted as escort for the contestants. There were twenty clean-score cars at the finish, penalties being laid for lateness at controls only.

There were over 300 cars in the procession that escorted the tour into Boston and an immense amount of interest was aroused in the automobile by reason of the splendid demonstration of reliability given by the cars.

The Automobile Club of Hartford was one of the earliest of the incorporated clubs in New England, coming into existence as such in 1904. The Bay State Automobile Association, of Boston was organized in 1905. The automobile Club of Bridgeport, Conn., was formed prior to 1902 and the following clubs were in being throughout the section at the time of the formation of the American Automobile Association: Automobile Club of Maine, Automobile Club of New England, Boston; Automobile Club of Springfield, Mass.; Hartford Automobile Club; Massachusetts Automobile Club; New Bedford Automobile Club, and the Worcester Automobile Club.

All of these organizations changed form one or more times during the passage of 10 years and several of them went out of existence entirely or merged with organizations of larger scope.

The situation today shows much development. Instead of having dozens of clubs in each state, some of which work at cross purposes with the others, the club situation has resolved itself into state associations.

Each of the six states is represented by a state association and the constituent members of each are as follows:

Massachusetts—Massachusetts State Automobile Association, consisting of the following: Ashburnham Automobile Club, Athol Automobile Club, Bay State Automobile Association, Fitchburg Automobile Club, Gardner Automobile Club, Haverhill Automobile Club, Leominster Automobile Club, Malden Automobile Club, Automobile Club of Springfield, Taunton Automobile Club, Webster Automobile Club, Automobile Club of Winchendon and the Worcester Automobile Club.

Connecticut—Connecticut Automobile Association, consisting of the following: Automobile Club of Bridgeport, Automobile Club of Hartford, New Britain Automobile Club, New Hartford Automobile Club, New Haven Automobile Club, Automobile Club of Waterbury, Automobile Club of Willimantic and the Litchfield County Automobile Club.

New Hampshire—New Hampshire Automobile Association, consisting of the following: Dover Automobile Club, Cheshire County Automobile Association, Manchester Automobile Club, Nassau Automobile Club, Automobile Club of Portsmouth.

Rhode Island—Rhode Island Automobile Club.

Vermont—Automobile Club of Vermont.

Maine—Maine Automobile Association.

The American Automobile Association figures give these clubs a total membership of 5,700.

The Automobile Club of Springfield, Mass., held the pioneer good roads meeting of New England in October, 1908. The Massachusetts Automobile Association presented the first bill to require lights on all road-using vehicles ever presented in New England. The list of accomplishments of past and present organizations in New England might be continued indefinitely.

The significant thing about the work of the clubs in New England is that no matter how many minor points of difference have arisen from time to time, the main purpose, the furtherance of the automobile, has never been lost sight of.

New England grasped the truth that the automobile must serve as a source of profit and pleasure and the whole course of action since then has been to encourage the wide use of the motor car. As good roads and good accommodations are as truly parts of the car as the motor or tires, and as the user of the car can affect road and hotel conditions, the efforts of the clubs have been directed broadly toward those ends. But even a good car cannot traverse good roads and the tourists cannot enjoy excellent hotel accommodations unless the laws are so framed as to make motoring possible; consequently most efficient work has been done in the way of influencing favorable laws.

The New England clubs are proud of what has been done to show the world that the automobile is reliable and speedy, that it can climb hills and make long runs in safety, and they are a unit in viewing the course of legislation with pride.

New England's Influence on Legislation

National and State Laws Governing Operation of Automobiles Have Been Largely Based on Precedents Established by "Down East" Courts

FROM the viewpoint of the statutes, New England stands out prominently as a section. There is not a state in this great division of the country where the laws appear to be framed to hamper and harry automobile operation. Conservative in almost every phase of human activity, New England is radical on the subject of the automobile, and its radicalism takes the form of liberal, fostering laws that might be followed with profit elsewhere in the land, particularly in New Jersey.

With more good roads than are enjoyed by any other part of the country in proportion to its size; with delightful and varied scenery and liberal laws, it is no wonder that there is more use made of the automobile in New England during the out-door season than anywhere else in the United States.

New England's start toward its present attitude was not more auspicious than it was elsewhere. When the first automobiles began to appear on the roads there were various severe restrictive measures enacted both by states and municipalities aimed at the trackless locomotives, as motor cars were called. At first it was almost as difficult to operate an automobile within the law as it would be for a camel to pass through the eye of a needle. In Massachusetts a case is recorded where a horse took fright from a noisy exhaust and while the driver managed to stop the animal without injury, another horse was frightened by the first runaway and dashed down the highway near Springfield. In its course it passed a farmhouse and an invalid became so alarmed that he suffered a paralytic stroke. Suit was brought against the owner of the car, not only by the owner of the first frightened horse, but also by that of the second and the invalid who was stricken.

But when the manufacture of automobiles became a science and the product developed more and more reliability and stability and consequently grew in public favor and use, New England, as the playground of the Eastern states, grasped the opportunity and embraced the automobile.

All the states advertised their attitude and welcomed visitors with their cars. Vast sums of money were used to experiment with road making in order to make the section attractive to motorists and the result is to be seen from one end of New England to the other in the general prosperity that has followed the reception given to the automobile.

There is still much to be desired in the way of uniformity, but in the main New England is in excellent shape from a legal viewpoint, as may be seen from the following summary of the existing statutes:

Taking the matter up by topics, the laws of the six states comprising the section make the following provisions with regard to registration of non-residents, limit of speed and speed regulations, fees and other provisions.

Concerning Non-Resident Registration

AS New England is an ideal touring field attracting thousands of tourists each season, the matter of non-resident registration assumes a wider importance than almost anywhere else in the country. Two of the states have thrown open their doors unreservedly to automobile tourists who have complied with the laws of their home states. These states are Connecticut and Maine and upon the statute books of each the non-resident who desires to tour is specifically granted that right free, provided he has registered at home and carries his license plates as provided for in the local laws.

In New Hampshire, Massachusetts, Vermont and Rhode Island, non-residents are exempt from registration for 10 days a year, after complying with the laws on this subject in their home states.

The widening of the rights of non-residents in Connecticut was accomplished in 1911, when the new law went into effect. Prior to that time tourists from outside were limited to 10 days' visiting.

Limited licenses are granted to tourists in Vermont and New Hampshire during the open season and in Massachusetts a reduction in the fees is provided for the visitors who overstay the statuotory limit. In the two first named states the fee is practically cut in half for the benefit of summer and autumn residents.

There is a movement on foot in New Hampshire and Vermont to let down the bars entirely and at various times Massachusetts has been the scene of similar agitation. Rhode Island seems to be a laggard in this regard, but when the tendency toward opening up the whole of New England has progressed a little further it is unlikely that this state will stand out for existing conditions.

The speed laws are badly in need of standardization, just as they are everywhere else in the country. In Connecticut no hard-and-fast speed limit is stated in the law. Speed must be reasonable and proper at all times and 25 miles an hour for 1-8 mile is presumptive evidence of unreasonable speed, but the law states that the presumption may be relieved by showing that no one has been endangered by reason of that speed, or in fact any ordinary speed. The Connecticut law states that 10 miles an hour is presumptively unreasonable speed approaching a bridge, turn, grade or where the road is obstructed from view, but evidence that such speed endangered no one will upset the presumption. A speed of 3 miles an hour passing a street car about to deliver passengers is presumptive recklessness, but such presumption may be overthrown by evidence that no one was put in jeopardy.

Connecticut's Speed Law Is a Model

SUCH a law as Connecticut's with regard to speed might be taken as a model for the other states of the section. Under such a statute the operator of a car might be convicted of reckless driving for making 10 miles an hour under certain road and traffic conditions and might prove guiltless if he drove 40 miles an hour. The essence of the law is reasonableness. The way it works out is simply to require operators of automobiles to use care, discretion and skill and to make them observe the rights of others.

Maine allows a maximum speed of 15 miles an hour. Maine's roads are not so good as those of her sisters and it has been observed that the authorities are disposed to wink and look the other way if the driver of a car is making reasonable speed under reasonable conditions. But the law distinctly states that 15 miles an hour is the limit, and while it may not be enforced in all cases, it exists and can be used whenever the authorities determine to do so.

In New Hampshire, Vermont and Rhode Island, the maximum speed limit is set at 25 miles an hour. In New Hampshire, the law is somewhat similiar to that of Connecticut as the doctrine of reasonable care is applied to the speed limitations. The motorists must reduce speed to that basis on curves, blind corners,

crossings, etc., and shall not exceed 15 miles an hour in business sections.

In Vermont the speed limit of 10 miles an hour is set for business and residental sections and upon bridges, etc.

In Rhode Island 15 miles an hour is the limit in business sections, while on curves, crossings, bridges and when passing other vehicles the car must be under control.

Massachusetts makes 20 miles an hour the maximum legal speed and requires under 15 miles an hour in business sections. On curves, crossings and intersections, 8 miles an hour, while a signboard warning to go slow or the passing of pedestrians calls for a reduction of the speed.

The prevailing tendency of New England is shown most distinctly in the new laws of Connecticut and New Hampshire, where reasonable care is the prime essential in driving and mere speed is of secondary importance.

Maine is figuring on stretching the speed limit, and the next motor vehicle law enacted in that state will probably be framed along the lines of the Connecticut statute with respect to speed.

The situation in Massachusetts is somewhat mixed. The present legislature has a mass of tentative matter before its various committees and the likelihood of real legislation is not so promising.

The differences among the existing laws is emphasized in the sections devoted to fees. In Connecticut there is a flat rate of 50 cents per horsepower. In case license is taken out after March 31, the rate is three-fourths of that amount; in May two-thirds and a proportionate reduction for later dates of registration.

In Maine the fee is $2 for registration; in New Hampshire $10; in Vermont, $1 per horsepower; Massachusetts $5 to $25; Rhode Island $5 to $25.

Fees, License Plates and Signals

THE matter of fees is largely local and in the event of an opening of doors to non-residents it would be of small importance to those who do not reside within the section. The prevailing tendency is toward some such basis as obtains in Massachusetts, Rhode Island and Connecticut. A horsepower foundation for fees seems to be growing in legislative approval.

Under the head of other regulations, practically all the remainder of the legal provisions may be grouped. These include lighting regulations, license display, mufflers, signals, brakes and miscellaneous.

All six states require at least one light in front and Massachusetts and Connecticut provide for at least two front lights. In these two states, the lights must be shown from a half hour after sunset to a half hour before sunrise. In the other four, a half hour less at each end of the night is required for the lights. Red lights behind are required in Connecticut, Massachusetts and Rhode Island.

There is one point where all the laws agree. License plates must be shown front and rear on all cars irrespective of whether they are owned by residents or non-residents. The rear plate must be lighted at night.

Muffler cut-outs are barred in Vermont, Massachusetts and Rhode Island and are limited to sections used for other purposes than business in New Hampshire, while in Connecticut they may not be used at all after 9 o'clock at night and before 6 o'clock in morning nor at any time within the limits of cities. The Maine law does not cover the point.

A suitable bell or horn must be carried for signaling purposes in Connecticut; suitable signal in Maine, Vermont, Massachusetts and Rhode Island. Sirens are barred in Massachusetts and Connecticut. New Hampshire does not specify what is needed, but under the doctrine of reasonable care, judgment and discretion must be used.

The Connecticut statute provides for two sets of brakes at least for every automobile exceeding 10 horsepower. One set shall act on the driving wheels or driving mechanism. Massachusetts requires two sets, while New Hampshire, Vermont and Rhode Island demand that the brakes shall be suitable.

Connecticut, Massachusetts and Rhode Island are about alike as to registration fees; Maine and Connecticut are free to non-residents. Vermont charges the largest fee for registration, but ameliorates this condition by its lenience toward summer tourists.

In fact, throughout the section there is a widespread tendency toward liberality, particularly as it applies to automobile tourists and summer residents. The legal status of the automobile in New England will be established on an equable basis within a short time, judging from the progress that has been made in this line since the car first assumed an interstate aspect. Three distinct phases of legislation have been passed. The first was prohibitive, unreasonable and unconstitutional. The restrictions were so sharp that the use of the car and the observance of the law at the same time were practically impossible.

This condition was succeeded by statutes less severe and more reasonable in their intent and these in turn by the existing laws. Each change marks a step toward personal liberty and each results from and in a better common understanding.

Uniform Law Prospect Not Promising

TODAY, when almost anyone is likely to be an automobile owner or operator, the line of demarcation that formerly divided the motorists from the non-motorists as classes is disappearing. The fact that an automobile owner may also be a pedestrian or street car patron or even the driver of horse equipment at times when not engaged in motoring has gone a long way toward broadening the general viewpoint of the public. The public has become impressed with the truth of the conclusion that he is a citizen before he is a motorist and that he has the opportunity of viewing the situation from several angles.

Starting from this rather precarious foundation, the prejudice against automobiles as evidenced in the early laws gave place to tolerance in New England and elsewhere. From tolerance to a warm welcome seems a long step, but the people of New England under the lead of the automobile organizations took the step easily, revised the objectionable laws, disregarded a few of the bluest provisions and let their attitude show that the mere ownership of an automobile was no crime, to their minds at least.

According to the best authorities the prospects for uniform automobile legislation within the immediate future are not promising, but ultimately the laws of New England will be similarly framed if not absolutely identical. From a territorial viewpoint, the whole section is only about as large as some of the individual states and constitutes a single touring field of marvelous possibilities.

That the laws ought to be alike in all six states is regarded as axiomatic and that they will be so framed, on a reasonable basis, is considered an ultimate certainty.

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Texas Owners Personally Liable

AUSTIN, TEX, Feb. 26—The Fourth Court of Civil Appeals of Texas has just rendered a decision that is of unusual interest and importance to the owners of automobiles. In substance, the decision holds that an automobile owner who rents or lends his car to someone else cannot disclaim responsibility for damages if the renter or borrower of the machine runs into or injures a person or property. The particular case in question was that of S. S. King vs. the Brenham Auto Company, of Brenham.

Associate Justice W. S. Fly, who wrote the opinion says that the person whose name the number on the automobile was issued is the responsible one, no matter whether he or someone else was driving at the time of accident. In the trial court the jury exonerated the Brenham Auto Company from all responsibility for the injury of a person who was run into by one of its cars that was being driven by a 17-year old boy who had rented it from its owner. The appellate court reversed and remanded the case.

ELECTRIC VEHICLES

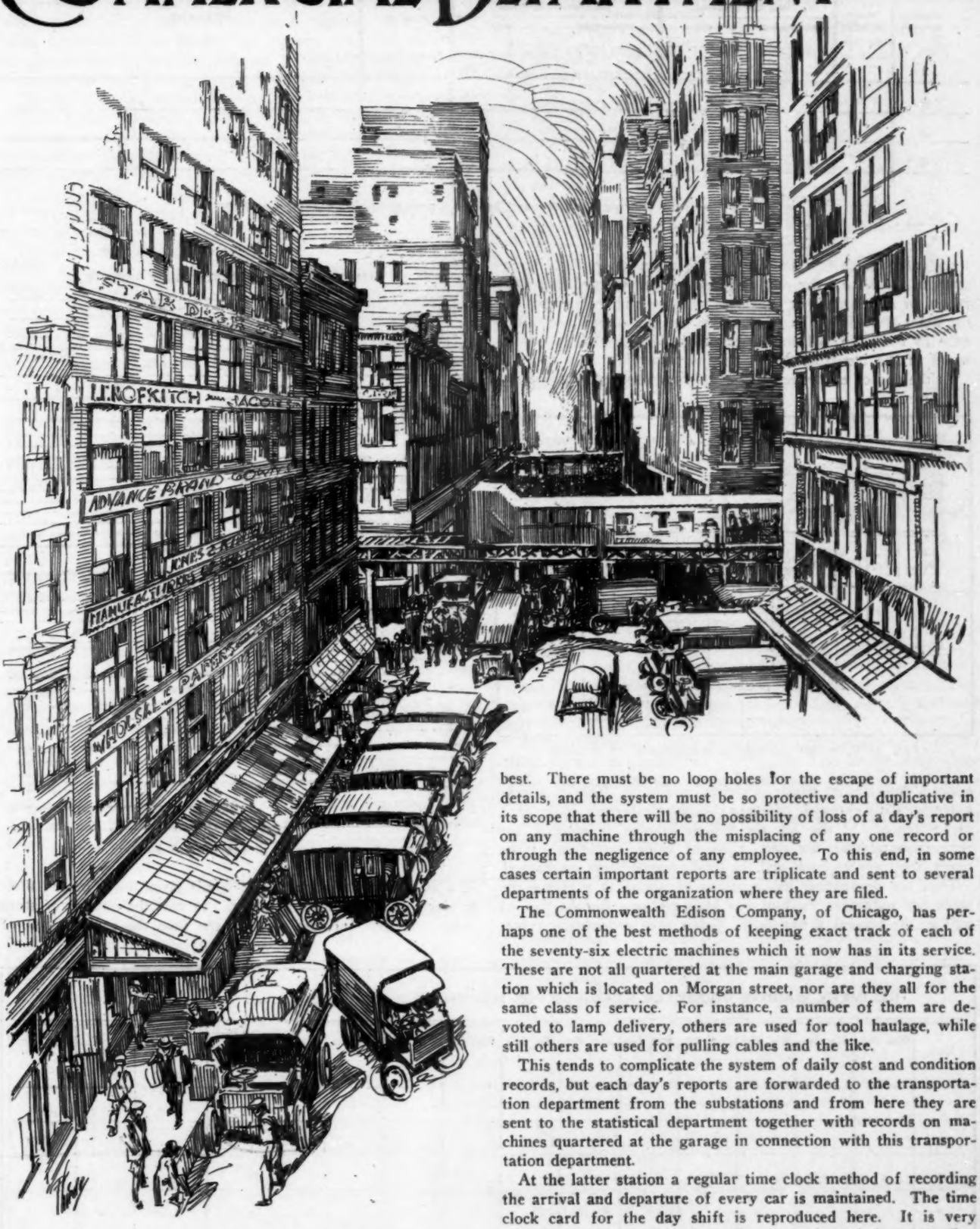
For heavy loads in congested districts the electric commercial car is ideal

USERS of large fleets of commercial electric vehicles must know at the close of each day just how each machine has performed; they must know the mileage each has covered, the condition of the cells of the battery, the general condition of the mechanism and the amount of current used. Several other less important items are usually recorded also, and in most cases the operator in charge of the system can put his hands on any particular vehicle so to speak at any time of the day.

These daily reports are the basis on which the monthly statistics of the operation of the entire fleet are computed. The operation of each of the vehicles can be checked against that of the others in the service and cases where there is excess of current used for average mileage or where in any way a machine does not compare favorably with the others can be located immediately from recapitulation sheets.

Since the cost records must hinge primarily on the garage from which the daily reports of vehicle performance and condition emanate, the system of record keeping here must be of the

COMMERCIAL DEPARTMENT



In the grocery and produce district of Chicago commercial rigs are plentiful

best. There must be no loop holes for the escape of important details, and the system must be so protective and duplicative in its scope that there will be no possibility of loss of a day's report on any machine through the misplacing of any one record or through the negligence of any employee. To this end, in some cases certain important reports are triplicate and sent to several departments of the organization where they are filed.

The Commonwealth Edison Company, of Chicago, has perhaps one of the best methods of keeping exact track of each of the seventy-six electric machines which it now has in its service. These are not all quartered at the main garage and charging station which is located on Morgan street, nor are they all for the same class of service. For instance, a number of them are devoted to lamp delivery, others are used for tool haulage, while still others are used for pulling cables and the like.

This tends to complicate the system of daily cost and condition records, but each day's reports are forwarded to the transportation department from the substations and from here they are sent to the statistical department together with records on machines quartered at the garage in connection with this transportation department.

At the latter station a regular time clock method of recording the arrival and departure of every car is maintained. The time clock card for the day shift is reproduced here. It is very similar to those used in the ordinary employees' time recording system. On the day card, Fig. 1, the name of the driver and his number are entered at the top, as well as the date on which the

DAILY ELECTRIC AUTOMOBILE CHARGING RECORD.
NIGHT CHARGING

COMMONWEALTH EDISON COMPANY. _____ 191__

VEHICLE NUMBER	PLUG NUMBER	TIME ON CHARGE		METER READINGS		K. W. H.	REMARKS
		BEGINNING	END	BEGINNING	END		
1							
2							
3							
4							

Fig. 3—Night charging blank used by the Commonwealth Edison Company

week ends. Each time the car bearing the number which is entered at the left of the card is taken out or returned, the clock record of such arrival or departure must be made. The card for the night shift, is similar to that for the day record, the difference in the ruling of the latter being made necessary on account of the construction of the time recording apparatus.

At the end of each week these cards are checked with the operator's daily report which is shown in Fig. 2. This is a very extensive daily chronicle of every conceivable feature of the car's performance. At the top the vehicle number is entered, the requisition number, the date, class of work, condition of the roads, approximate loads and the total ampere hours discharged.

Name .....
No. .....
Week Ending.....191...

Car No.	A. M. In	A. M. Out	A. M. In	A. M. Out	A. M. In	A. M. Out	P. M. In	P. M. Out	P. M. In	P. M. Out	P. M. In	P. M. Out

Fig. 1—Card for recording movements of drivers

AUTOMOBILE OPERATOR'S DAILY REPORT.

VEHICLE No. _____ REQUISITION No. _____ DATE _____ 191__
CLASS OF WORK _____ CONDITION OF ROADS _____
APPROXIMATE LOADS _____ POUNDS. TOTAL AMPERE HRS. DISCHARGED _____

TIME START	TIME RETURN	HOURS OUT	No. OF STOPS	ODOMETER START	ODOMETER RETURN	MILES	AMP. HRS. PER MILE	AMPERE HOUR METER BEGINNING	AMPERE HOUR METER END

RECORD OF STOPS.

STOPS	TIME	ADDRESS	STOPS	TIME	ADDRESS
1			11		
2			12		
3			13		
4			14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

FOR ADDITIONAL STOP RECORD, SEE REVERSE SIDE

RECORD OF BATTERY CHARGING EN ROUTE.

CHARGING STATION	AMPERE HOUR METER BEGINNING	AMPERE HOUR METER END	TOTAL AMP. HRS.	WATT HOUR METER BEGINNING	WATT HOUR METER END	TOTAL K. W. H.	

SIGNED _____ CHARGING STATION OPERATOR

AT END OF RUN,
CONDITION OF BATTERY _____
" " STEERING GEAR _____ BRAKES _____
" " MOTORS _____ RUNNING GEAR _____
" " CONTROLLERS _____ TIRES _____
ACCIDENTS OR BREAKDOWNS _____

GIVE FULL DETAILS, WITH NAMES AND ADDRESSES OF WITNESSES, ESPECIALLY OF NON-EMPLOYEES OF THE COMPANY, IN CASE OF ACCIDENT.

OPERATOR _____
APPROVED _____ FOREMAN. ASST'T OPERATOR _____

Fig. 2—Daily report of operator of electric wagon

Thus the department has a means of noting at a glance the loads any particular machine has been carrying for the day, as well as the current it has used. Below this information a sort of a small recapitulation of the details given lower on the sheet is given. Here the man in charge can note the number of stops made, the total mileage covered, the time the car was out of

DELIVERY WAGONS ODOMETER READINGS FOR MONTH OF.....191.....

Date	Rig. No. 1	Rig. No. 2	Rig. No. 3	Rig. No. 4	Rig. No. 5	Rig. No. 6	Rig. No. 7	Rig. No. 8	Rig. No. 9	Rig. No. 10	Rig. No. 11	Truck No. 12	Rig. No. 13	Rig. No. 66	Rig. No. 67
1															
2															
3															
4 (to 31)															

Fig. 5—Form showing manner in which the monthly odometer readings of all the vehicles are recorded

the station, and the ampere-hours consumed per mile of travel.

Below this, the records of the stops made and the battery charging en route are added. These afford an exact check on the whereabouts of the driver for the period during which he is out. At the end of the day's run he is required to record the exact condition of the battery, the motors, tires, and so on, in the spaces provided for that purpose. If any accidents or breakdowns on the road have occurred, these must also be noted.

The day charging record sheet has the vehicle numbers placed in their proper column. Information as to the wattmeter and odometer readings is set down in connection with the vehicle numbers and the plug numbers. Across the top of the sheet the time of charge is entered, and below in the corresponding space, the ampere hours charge are figured. The wattmeter reading at the end of the period of charging is recorded at the extreme right for convenience.

For night charging, a separate blank is used by the Commonwealth Edison Company. This is reproduced in Fig. 3. This blank is also made up daily. To the extreme left the vehicle numbers are placed, while the next column is used for the recording of the number of the charging plug which was used for rejuvenating the battery. The time on charge must also be set down, as well as the meter readings at the beginning and the end of the operation.

At the close of each 24 hours, then, there is a complete record of each machine which has been used during the previous day. These daily reports are forwarded to the proper department where they are entered on the monthly record sheets.

About once a week the battery of every vehicle is tested, and the report of such test is entered on a special form shown by Fig. 4. Here the battery number and the vehicle number are entered, and below this there is a diagram made up of a series of numbered squares. These represent the cells of the battery, this particular form being designed for a battery having forty-two cells, and seven cells to a tray.

The voltage of each cell is tested and entered in its proper place. The figures which appear represent hundredths of volts. They should read somewhere around 188 to 194 and if they do not, as in the cases of cells numbers 6 and 7, an explanation covering their deficiency is entered at the bottom. In this instance, cell number 6 was short circuited, its plates had buckled and the separators were perforated, bringing its voltage to a low figure. Number seven was short circuited.

At the right, the specific gravity of each tray is entered. The total mileage of the battery is also noted, together with the condition of the battery plates and the date it was put into service. This gives a basis for full and complete information as to the exact status of every vehicle battery owned by the company.

Form T. B. 29 — 20 Blks. (1-30-12)

VEHICLE BATTERY TEST RECORD.

BATTERY NO. 153 VEHICLE NO. 73 DATE Feb. 24 1912

FRONT END OF BATTERY.

1	2	3	4	5	6	7	TRAY NO. 1 AV. SP. GR. 1280
194	185	194	188	194	6	20	
14	13	12	11	10	9	8	TRAY NO. 2 AV. SP. GR. 1280
188	188	190	185	188	188	194	
15	16	17	18	19	20	21	TRAY NO. 3 AV. SP. GR. 1280
185	188	188	190	190	185	188	
28	27	26	25	24	23	22	TRAY NO. 4 AV. SP. GR. 1280
185	194	194	188	194	185	190	
29	30	31	32	33	34	35	TRAY NO. 5 AV. SP. GR. 1250
186	188	185	185	188	194	190	
42	41	40	39	38	37	36	TRAY NO. 6 AV. SP. GR. 1280
194	188	188	188	190	185	194	

MILEAGE TO DATE 3965

DATE PUT IN SERVICE Jan 17 1911

CONDITION OF PLATES, POS. Good NEG. Good

Cell #6 short circuited; plates buckled; separators perforated. # 7 Short circuited.

Fig. 4—Filled-in battery test record for electrics

Monthly reports of delivery wagon odometer readings are kept. These have a form similar to Fig. 5, and they are made up from daily reports which have already been mentioned. On these sheets the daily readings are entered individually for each rig, and totaled at the end of the month.

A monthly record which is in effect a recapitulation of all the daily reports is reproduced in Fig. 6. This is the final form which the transportation department must deliver to the statistical department.

On this monthly statement, the total electrical energy used for vehicle purposes is brought out.

MONTHLY RECORD OF ALL ELECTRIC VEHICLES

Month of .....191.... Signed by.....

Vehicle No.	Miles	Stops	Amp. Hrs. Discharged	Net K. W. H. Charge	Net K. W. H. Per Mile	Amp. Hrs. Discharge Per Mile	Amp. Hrs. Charged	Percentage of Overcharge	REMARKS
1									
2									
3									
4									
5 (to 63)									
Total									

Net K. W. H..... Total K. W. H. Gross .....

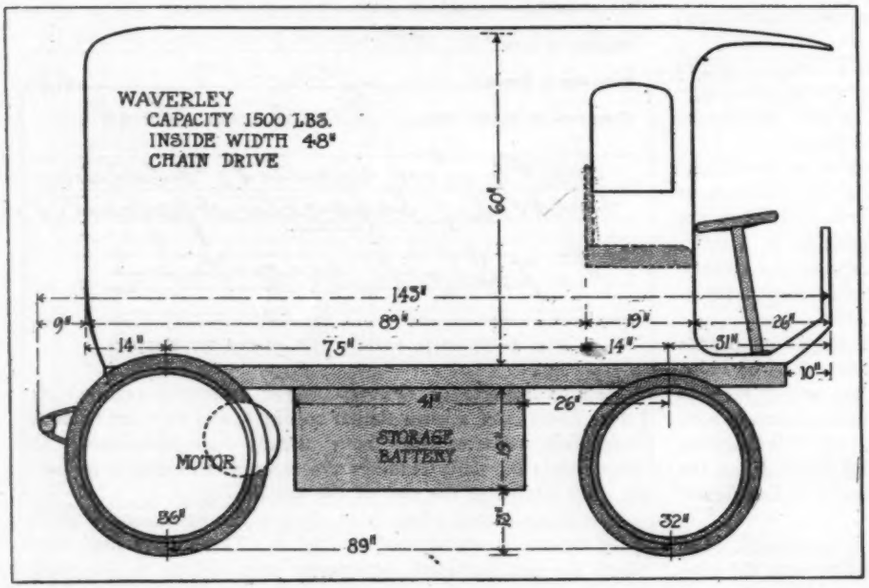
K. W. H. Loss in Charging Apparatus.....

Fig. 6—Form of monthly report which recapitulates all the daily sheets turned in by the operators

Analysis of Commercial Electric Vehicle Design

Details of Construction as Manifested by Present-Day Practice—Motor and Battery Location—Distribution of the Load, Etc.

Types of Batteries Usually Furnished—Proportion of Overall Length Back of Rear Axle—Available Body Space and Body Width in Representative Examples



The Waverley light delivery type which has 62.2 per cent. of its overall length devoted to load space

ELECTRIC commercial vehicles are rapidly coming into their own in this country, and although their value in the world of business has been realized for some time by those firms which carry on a large delivery service, the average merchant has only within the last few years become alive to their possibilities as time and money savers. Now, they are duly considered by the wise concern which is in the market for commercial cars, no matter what its line of business, and if they are not adopted it is only because they are not as well fitted as are gasoline machines to the particular class of service required.

Each class of commercial vehicle has its field. For short hauls and in city traffic the advantage is certainly with the electric for the reasons that as soon as the machine is stopped there is no energy consumption, and its speed is ample for the negotiation of congested city thoroughfares. With the gasoline truck in delivery service, when a large number of stops is necessitated within a short distance, there is a fuel loss because it is impracticable to shut off the motor every time the car is stopped for a delivery.

On the other hand, the gasoline machine is better adapted for long hauls; that is, where the distance between stops is considerable, and for heavier loads. The gasoline machine is faster, and its radius of mileage is very much greater. But for hauls of medium length and with loads ranging around 2 tons, the present electric vehicle with its improved batteries and perfected details of chassis design is coming to be a strong competitor of the gasoline truck. For their class of service, the express companies believe the electric truck to be the best, as evidenced by the large number of these vehicles used by them.

There are a number of reasons which may be given for the more general use of the electric commercial vehicle, among which are: it does not require an expert driver to handle it; there are few working parts to get out of order, and it is as nearly perfect mechanically as any other piece of modern machinery.

Batteries have been perfected, which, while they are much lighter in weight than the older types, have greater current capacity, giving the truck greater mileage on a charge. Motors have been very carefully designed for the particular service which they are expected to give; the power transmission members have been so constructed that they meet the conditions imposed in a manner compatible with modern ideas of engineering design; weight has been very fully considered and apportioned so that no part of the vehicle takes more than its proper share; springs have been carefully made and placed so that the minimum of jar to the vehicle parts is obtained: in fact, every detail which enters into the construction of the electric commercial vehicle of today has been thoroughly gone over for its mechanical correctness.

The motors of electric vehicles are in most respects similar to those used in electric railway cars. They are, of course, smaller but they present the same general appearance, and have overload capacities sufficient to carry the vehicles up hills and grades. In some cases the overload which can be safely carried is several times the normal rating of the motor, and this gives it a high efficiency.

Electric Motor Simple

There is very little about this special type of motor to get out of order. It is generally inclosed in a housing which prevents any dust, dirt or water from getting at the armature, poles or wiring. In some cases the supports for the motors are cast integrally with the casings, while in other designs separate brackets are provided for rigidly fastening the motors to the frames of the cars.

The average motor speed is about 1,200 revolutions per minute, although a number of electrics are equipped with higher speed motors. The speed of the General Vehicle motor is 2,000 revolutions per minute for its 1,000-pound truck and 1,600 for its 700-pound vehicle.

Motors are usually fastened to the frames of the machines between the jackshafts and the rear axles, and their axes are parallel to these members. From this position the power is transmitted forward to the jackshaft, then to the rear axle by means of side chains, as in the usual gasoline truck construction.

There are a number of exceptions to this arrangement, however, among which are the M. & P., the Walker and the G. M. C. designs. In the first of these, the motor is placed near the front of the machine and forward of the battery box. The

Walker vehicle has a peculiarly designed motor and transmission, the former being housed in the hollow rear axle. The G. M. C. motor is placed longitudinally and a little behind the rear axle.

The real limiting feature and therefore one of the most important parts of the electric vehicle is the storage battery. One of the first questions which the intending purchaser asks of the manufacturer is how far the vehicle will travel on one battery charge.

With a given load and at a given speed the mileage possibilities of an electric commercial car depend quite largely on the character of the roads. The harder, smoother and more level they are, the better will be the mileage records of the vehicles. Besides the fact that hills, soft mud, sand and rough pavement cut down mileage, strong head-winds also have a tendency to do the same thing. Therefore, since the electric storage battery has a definite ability to carry a certain total weight a certain number of miles at a given speed under certain known road conditions, once these items are known, the earning power of the truck as well as the operative costs with any given battery equipment are defined.

Cold Affects Mileage

In winter the mileage on one battery charge is cut down somewhat. This may be explained from the fact that since power results from the expenditure of heat energy it naturally takes more heat the colder the weather for a given power development. Electric vehicle makers have realized this and have so housed their batteries that they are protected from the cold as far as possible. This, no doubt, has some bearing on the greatly increased mileage of the electric vehicle of today.

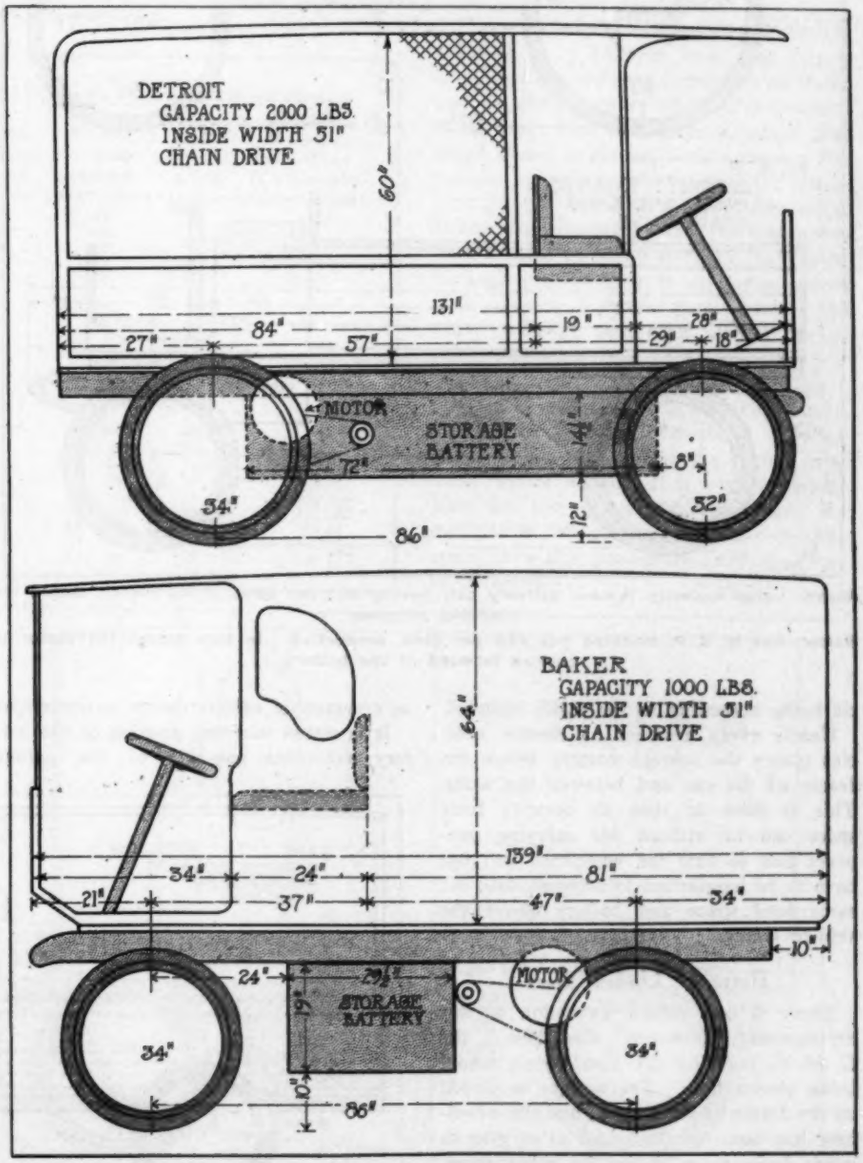
It has been found that batteries give the best results and cost less per ton-mile when they are not worked to their ultimate limit every day. For this reason, makers advise the use of batteries of ample size for the conditions to be imposed. The mistake should not be made, however, of using too large batteries, as excess battery and unnecessary weight increase the current consumption, tire costs and depreciation.

The series of eight diagrams of electrics which accompany this article are examples of the manufacture of as many different makers. They have been taken at random from the various chassis types and body designs which these firms produce, and in the majority of cases may be regarded as representative of each maker's product.

In most cases the battery equipment is optional, and those here given are the types usually furnished with the particular machines illustrated. Most makers will equip their vehicles with Edison, Exide, Gould or any other battery which the purchaser may specify, the price of the vehi-

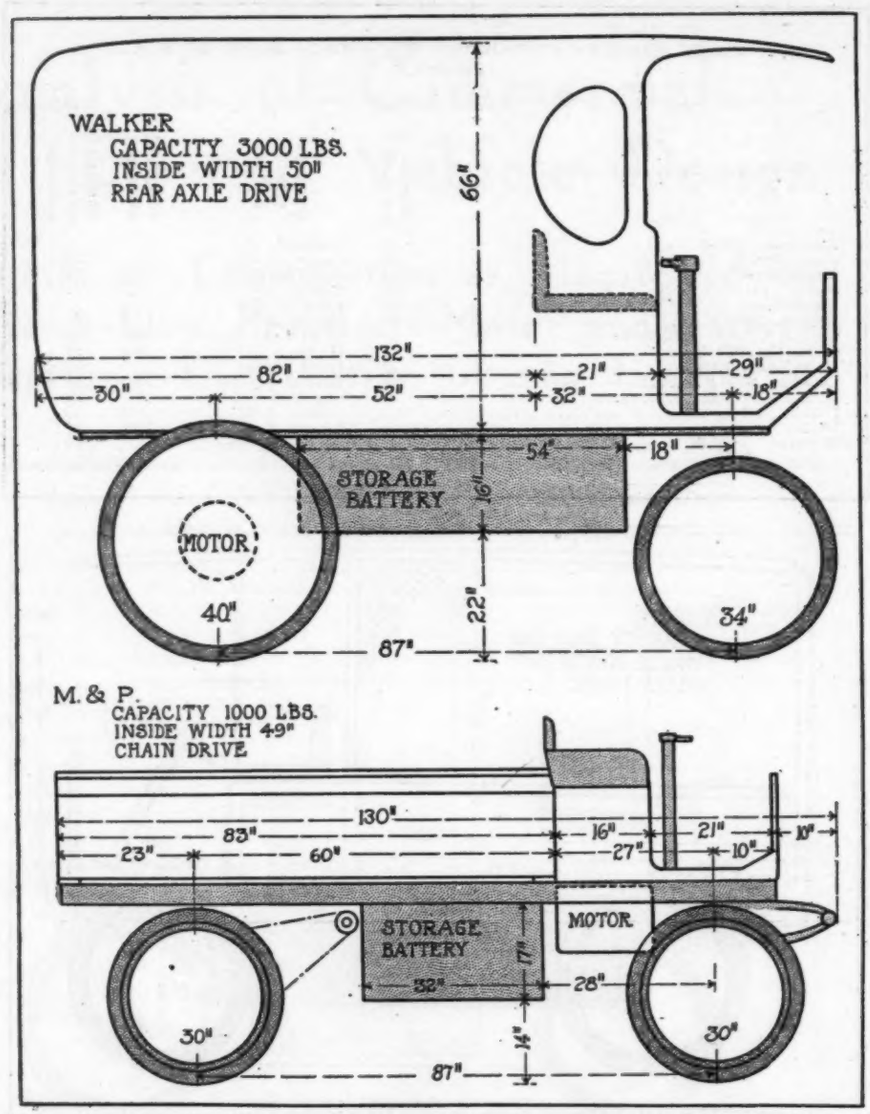
BATTERIES USUALLY FURNISHED WITH EACH MAKE OF ELECTRIC VEHICLE

Make and type of vehicle	Number of cells	Make and type of battery	Weight of battery	Radius of mileage on a charge
American, 7000-lb.	42	National	....	..
Argo, 1000-lb.	28	Exide 11 Pl.	....	50
Baker, 1000-lb.	42	Exide 9 P. V.	1050	55
Beaver, 1500-lb.	60	Edison A 6	....	..
Couple-Gear, 10,000 lb.	44	Lead 21 Pl.	....	..
Detroit, 2000-lb.	60	Edison A 6	1150	65
General Vehicle, 2000-lb.	44	G. V. Lead 11 Pl	1485	45
G. M. C., 3000-lb.	..	G. M. C. 30 A	1980	50
Hupp-Yeats, 1000-lb.	27	Exide Hycap 11 MV.	....	..
Lansden, 8000-lb.	60	Edison A 8	1600	50
M. & P., 1000-lb.	24	Gould 15 TH	975	55
Urban, 1000-lb.	50	Edison A 4	675	55
Walker, 3000-lb.	60	Edison A 8	1600	60
Waverley, 1500-lb.	42	Exide 11 Pl.	....	55



Above: Detroit car which has its motor inclosed within an extension of the battery box; 64.1 per cent. load space

Below: Light Baker delivery model. Carrying space back of seat 58.3 per cent. of overall length, and small rear overhang



Above: Large capacity Walker delivery car, having 62.1 per cent. of its overall length for loading purposes

Below: The M. & P. machine has 63.8 per cent. productive. In this design the motor is carried forward of the battery

cle being according to the make included.

Nearly every designer of electric vehicles places the storage battery below the frame of the car and between the axles. This is done so that all possible body space can be utilized for carrying purposes and so that the wheelbase will not have to be lengthened to accommodate the same load space and battery above the vehicle frame.

Battery Under Seat

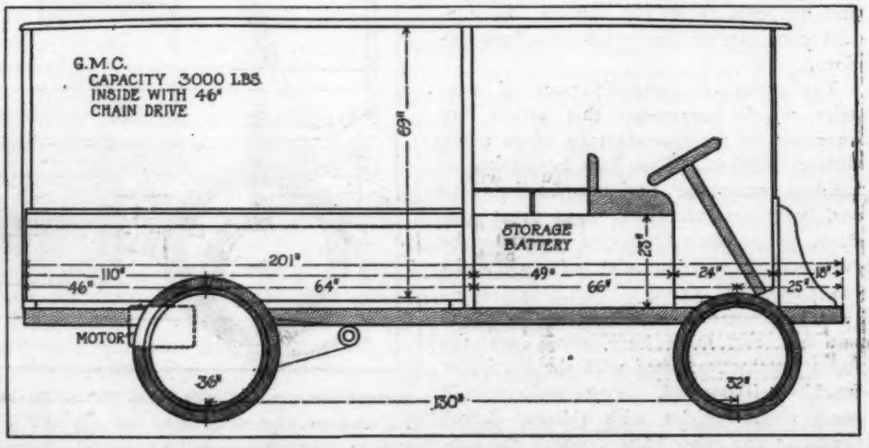
There is one notable exception to this arrangement, however, this being the G. M. C. machine, the 3,000-pound model being shown here. The battery is placed on the frame of the chassis, and the wheelbase has been lengthened so as to give as much body room as in the other types. The driver's seat is placed on top of this battery box. The makers claim a number of advantages for this battery location, which is a departure from precedent so far as commercial vehicle design is concerned.

It is stated that this position of the battery eliminates one-half of the garage labor, battery troubles and petty repairs; that it prolongs the battery life, since it puts it in a position where mud and dirt cannot so easily get at it; gives necessary road clearance and makes the individual cells more accessible. Of course, the proof of any new thing is in the service which it renders, and there seems to be no reason why this new electric cannot meet the claims of its makers.

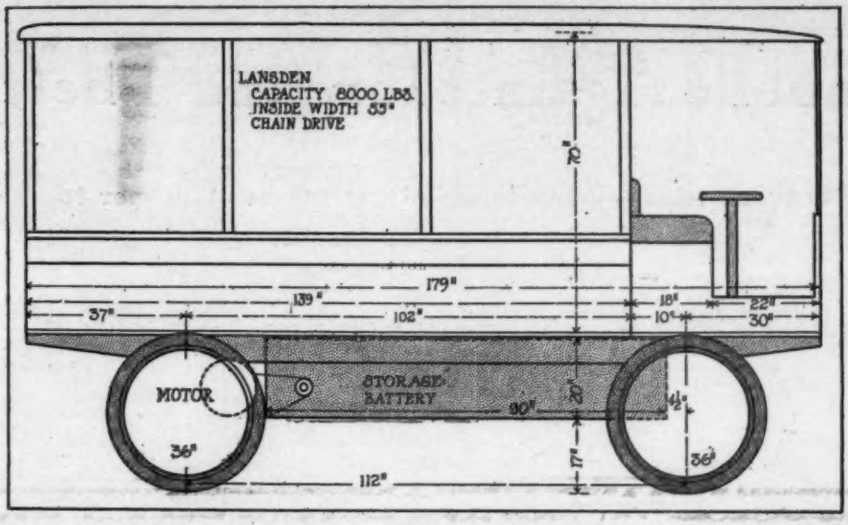
It will be noticed from the accompanying table that there is not much standardization in respect to location or size of battery accommodations. Naturally, the wheelbase has something to do with the position of the box with respect to the front axle. In all cases the road clearance is great enough for ordinary city road conditions, and in every instance it is equal to that of the gasoline machine. Some of the designs have much greater clearance than the average gas car, in fact. The lengths of the Detroit and Lansden battery boxes—72 and 90 inches, respectively—seem rather great at first, but when it is considered that the motors are also carried within them, these dimensions are not to be wondered at. Some designers accommodate the requisite number of cells in long, wide boxes, while others make use of deeper, shorter ones.

All electric truck makers have striven to make the cells of the storage battery easily accessible. In some cases the floor of the body above the battery is made removable, while in others the battery is reached from the side, as in the Baker and General Vehicle types.

Not the least important consideration in electric commercial vehicle design is the apportionment of the load space so as to get proper weight distribution. As in the design of any vehicle, too much weight must not be placed on the rear wheels and axle. In the average case, about two-thirds of the load is placed on the rear wheels, while the front ones are loaded enough to give them the proper tractive force. If the load is shifted too far to the rear, the front wheels will have a tendency to skid, while if too great a proportion is



The new G. M. C. model which carries its battery above the frame, making the wheelbase somewhat longer. Productive load space 54.7 per cent.



The Lansden machine of large capacity. Load space is 77.6 per cent. of the total. Battery box large to accommodate necessary cells

AVAILABLE BODY SPACE IN REPRESENTATIVE ELECTRIC COMMERCIALS

Make	Percentage of overall length devoted to load space	Width of body inside inches	Height of body (closed type) inches	Length of load space inches	Capacity of closed body space in cubic feet (approximate)
Baker, 1000-lb.	58.3	51	64	81	153
Detroit, 2000-lb.	64.1	51	60	84	149
General Vehicle, 2000-lb.	63.2	50	68	96	189
G. M. C., 3000-lb.	54.7	46	69	110	202
Lansden, 8000-lb.	77.6	55	70	139	310
M. & P., 1000-lb.	63.8	49	..	83	...
Walker, 3000-lb.	62.1	50	66	82	157
Waverley, 1500-lb.	62.2	48	60	89	149

BATTERY LOCATION OF WELL-KNOWN ELECTRIC COMMERCIAL CARS

Name	Distance from front axle	Road clearance	Length	Depth	Wheel-base
Baker	24 in.	10 in.	29½ in.	19 in.	86 in.
Detroit	8 in.	12 in.	72 in.	14½ in.	86 in.
General Vehicle	25 in.	12 in.	41 in.	19 in.	104 in.
G. M. C.	17 in.	24 in.	49 in.	23 in.	130 in.
Landsen	4½ in.	17 in.	90 in.	20 in.	112 in.
M. & P.	28 in.	14 in.	32 in.	17 in.	87 in.
Walker	18 in.	22 in.	54 in.	16 in.	87 in.
Waverley	26 in.	13 in.	41 in.	19 in.	89 in.

accorded them, steering is made difficult and front tire wear is made excessive. The designer of today has had to cope with all these difficulties in all types of automobile.

The rear overhang of the electric beyond the end of the frame is very little, if any. In the Baker design this amounts to 10 inches, but in the other cases the body does not extend beyond the end of the chassis. About one-fourth of the entire length of the machine is placed back of the rear axle in the average design, although in two cases, the Waverley and the M. & P. designs, this proportion is somewhat less. The following figures will serve to bring out this point:

Make	Per cent. of overall length back of rear axle
Baker	24.5
Detroit	20.6
General Vehicle	19.7
G. M. C.	22.9
Lansden	20.6
M. & P.	17.7
Walker	22.7
Waverley	16.1

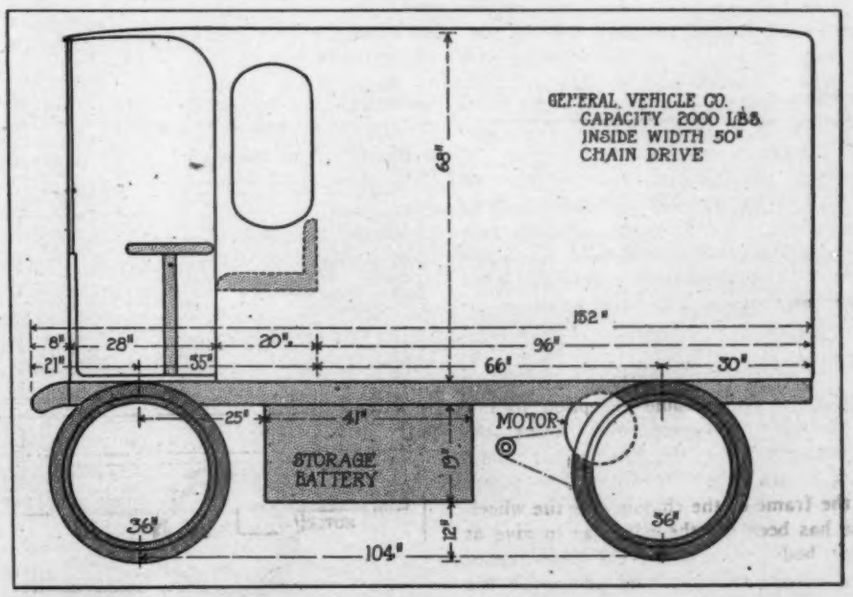
The available loading space back of the driver's seat is a big consideration in body design. Some machines which are designed for bulky articles have larger body space than others of greater capacity constructed for heavier goods which does not take up so great an amount of room.

It must be borne in mind that the figures given above apply only to the special type of body with which the car is equipped, and must not be considered as the only type with which any one of the makes mentioned can be fitted. The Lansden is seen to have the largest cubical capacity, which is to be expected from the fact that this particular truck was designed to carry any load up to 8,000 pounds. The Baker 1,000-pound machine was evidently designed for bulk delivery rather than for weight. This might also be said of the Waverley and General Vehicle machines.

Speed of Vehicles

The speed of the average electric ranges from 10 to 15 miles an hour, and this is ample for the ordinary conditions of traffic and the service under which it is designed to operate. Cost records have proven that speed above a certain limit increases the ratio of operating cost almost by the square over what it would be at reasonable speed. It has also been shown that the time saved over a route of many stops by the use of high speed to be little, if any, as compared with covering the same ground under the same operating conditions by the use of moderate speed.

The practice is now being made by a number of manufacturers of electric commercials of agreeing beforehand with the buyer on the speed which the vehicle is to have. After delivery it is next to impossible for the operator to manipulate the mechanism of the car so that greater speed than that previously fixed upon can be obtained.



The General Vehicle 2000-pound type has 63.2 per cent. of its total length for the load

Insuring Automobile Against Fire and Theft

Text of the Report of the Underwriters' Conference—Costly Cars Cheaper to Insure than the Medium-Price and Cheaper Grades

EXAMINERS connected with the New York Insurance Department have filed their report covering the activities of the Automobile Underwriters' Conference, which has succeeded the Association of Automobile Underwriters.

The report outlines the history of the conference and gives its rules for operation besides commenting upon some phases of its work that conflict with certain insurance laws. These comments deal with failure to keep detailed records of all corporate proceedings; in the matter of discriminatory rates and in special ratings of identical risks amounting to discrimination.

Comprises Thirty-six Members

The report contains the following text:

The Automobile Underwriters' Conference is at the present time composed of thirty-six members. All underwriters of automobile insurance within the United States and Canada are eligible to membership. The Association of Automobile Underwriters and the Automobile Underwriters' Conference are virtually composed of the same companies, the aims and objects are common to both and the histories of the two organizations form one continuous record. In this report the acts and proceedings of the Association of Automobile Underwriters are treated as part of the history of the Automobile Underwriters' Conference.

Organization and Objects

The objects of the organization are declared to be as follows:

1. To serve as a medium of exchange of information.
2. To secure the adoption of suitable and uniform policy forms and clauses.
3. To make investigations and recommendations with the object of eliminating or reducing danger of fire and other casualties.
4. To gather statistics and make investigations concerning hazards as a guide to underwriting by its members.
5. To furnish advisory rates of premiums to its members covering general or special classes of business or individual risks, whenever such rates are not prohibited by law.
6. To prevent the making of rebates.

The executive committee has general charge of the business and affairs of the organization and has the power to investigate risks and furnish advisory rates thereon to members. The committee also has the power to make, repeal, alter and amend the rules for the guidance of the organization and its members and it has authority to levy assessments upon members to cover the expenses of the organization.

No officer nor member receives any compensation for services and the assessments and disbursements to date haye been nominal.

Fire, Transportation and Theft Rates

A universal minimum rate of 2 1-2 per cent. was adopted by the association on December 10, 1909. A reduction of 20 per cent. of this rate was allowed on private cars which were guaranteed to be housed in a private garage.

On August 16, 1910, a schedule of rates on the following minimum basis was recommended for adoption:

List price of automobiles.	Rate.	Rate with private garage clause.
$3,500 or over	2¼%	2 %
Under $3,500 and not under $1,500	2½%	2¼%
Under $1,500	2¾%	2½%

These rates applying to private cars, commercial cars and dealers' cars. This schedule developed into a graduated tariff which was adopted in September, 1910, and with some slight modifications is still in force.

A graduated schedule is supposed to take into consideration both the physical and moral hazards, upon the following theories: The cheaper the car the poorer the construction and therefore the greater the physical hazard; also, the cheaper the car the less care it is apt to receive from its owner, an unintentional moral hazard being thus created; the values of the cars are supposed to be an index of the financial standing of the owner, and an increased moral hazard is always suspected with a weak financial condition of the insured.

These hazards are reflected in the schedule in the following manner: The rates are based on an average of 2 1-2 per cent.; all medium grade automobiles, that is, those listed between $1,500 to $3,500, have a basis rate of 2 1-2 per cent.; automobiles listed $3,500 or over have a basis rate of 2 1-4 per cent., and automobiles listed at less than $1,500 have a basis rate of 2 3-4 per cent. The above schedule of rates also embodies a co-insurance principle. When the insured obtains a policy covering practically the full value of the car, the rate charged is the minimum or basis rate appearing in the column in which that car belongs. If the insurance does not cover the full value of the car the schedule provides for an increased rate in accordance with the reduced amount of insurance.

From the above it will be noted that the original list price of the car is an important factor in the rate. The age of the car, however, is a factor only second in importance to the list price. A new car as compared with an older car is considered a safer physical risk, and there is also considered to be a minimum of moral hazard. As the car ages the physical hazard increases on account of the wear and tear, and the moral hazard in time assumes such proportions in the judgment of the underwriters that models over three years old are generally classed among the prohibited risks. In order to obtain the advantages of the low hazards of the new and high grade cars, and to guard against the increased hazards of the older cars, the conference has adopted minimum and maximum limits of insurance.

Collision Rates

For purposes of collision insurance private cars have been specially rated according to manufacture, list price and model. The classes are designated A, B, C, etc. There are two forms of collision riders used, the "$25 deductible average" and the "full coverage," both of which are described under "Policy forms and features." The rates for the "full coverage" clause are uniformly $35 higher than for the "$25 deductible average" clause, for example:

	$25 deductible average.	Full coverage.
A	$28.00	$63.00
B	32.00	67.00
C	36.00	71.00
X	180.00	215.00
Y	190.00	225.00
Z	200.00	235.00

The premiums are flat rates regardless of the age of the car or its actual value at the time of insurance. The insurer's liability is limited to the amount expressed in the policy to which the collision clause is attached.

Public and livery vehicles are charged 4 per cent. of the manufacturers' catalogue list price plus full cost of equipment

for the "$25 deductible average" clause and commercial cars are charged 2 2-5 per cent. of the list price. The "full coverage" clause is permitted for an additional charge of $35.

Property Damage Rates

Rates for private cars are based upon the horsepower of the car, the schedule rates applying to $1,000 of insurance. An additional premium of 40 per cent. of the schedule rate is charged for each additional $1,000 of insurance. Different rates are charged in certain defined districts, viz.:

Schedule 1 applies to certain districts in and around the cities of New York, St. Louis, Chicago and Kansas City.

Schedule 2 applies to certain districts in and around the cities of Boston, Philadelphia, Providence and Pittsburgh.

Schedule 3 applies to all other territory in the United States.

Special Rates

Under the rules of the Automobile Underwriters' Conference the executive committee will fix special advisory rates and approve special forms of policies on specific risks on cars owned by automobile manufacturers and on taxicabs in cases where one individual, firm or corporation owns or operates more than twenty of such vehicles in any one city.

The records of the conference as to special rates are not complete and it has been impossible to ascertain with any degree of certainty the extent to which any factor may have influenced the making of special rates by the committees of the conference. In one case it was evident that the competition from non-admitted companies was a controlling factor in the making of a special rate on a large line of taxicabs used in New York City.

It would seem that the Automobile Underwriters' Conference falls short of complying with the provisions of Section 141 of the insurance law by not keeping a careful record of all its proceedings. It should be noted, however, that this law went into effect on September 1, 1911, and this examination was made shortly thereafter.

There also appears to be a violation of that provision of the section reading, "No such association * * * shall fix or make a * * * rate which discriminates unfairly between risks within this state of essentially the same hazard belonging to classes having substantially the same fire class record, and which are similarly situated and protected against fire" by specifically rating risks involving twenty taxicabs or more, if such specific rating results in a rate lower than the rate which applies to a risk involving less than twenty taxicabs, the fire class record, etc., being the same.

The practice of the association: 1. To make special rates; 2. To devise and apply special policy forms in connection with special rates, would, if followed up by rates which result in different premiums for risks of substantially the same fire class record—that is, in accordance with the rule laid down in the law—amount to a violation of the provisions of such section. The association has no records which explain the makeup of the various special rates made, and an attempt to obtain this data from other sources was unsuccessful.

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Snow Booms Colorado's Prospects

DENVER, COL., Feb. 26—Colorado automobile dealers are smiling this month for more snow has fallen than in any other February for years and the prospects for a record-breaking trade in 1912 grow brighter with each succeeding storm. Snow has been falling steadily for the last 24 hours covering not only the mountain districts but also the dry farming district of eastern Colorado, where the prosperity of the year largely depends upon winter moisture. Inasmuch as crops through this section were poor last season and rural motor trade correspondingly small, the prospect of increased sales from the bounteous crops which now seem assured are making the local dealers most optimistic. As for the districts under irrigation an excellent year is almost certain for the extremely heavy snows which have been falling in the mountains all winter will make a steady inflow of water for the reservoirs on the plains during the latter part of the season while the surface water caused by the melting of the late snows in the vicinity of the reservoirs will fill them for the early summer months.

Many dealers have been out through their territory the past few weeks appointing sub-agents for the heavy rural trade which they confidently anticipate for the coming season.

—

Motorette Changes to Four-Cycle

HARTFORD, CONN., Feb. 26—The Motorette Company has announced that for the coming season its two-cycle motor will be replaced by a four-cycle engine. This motor will have enclosed mechanical valves. A valve motion case similar to that employed on a Maxwell car will be used, only instead of being on top of the motor it will be underneath, and below this will be an oil under-pan. The oiling of the new motor is accomplished by the large time gear always running in this oil pan, carrying the oil on its periphery up to the crankcase bottom, where a constant level of oil is maintained, the overflow going down through a slot. In this way a constant level oil splash system is maintained without the use of any specially built pump.

—

Mitchell Will Not Make Tires

RACINE, WIS., Feb. 26—The recent cable reports from London advising that a new tire was about to be placed on the American market have not been confirmed though it is practically assured that its manufacture in this country will not be abandoned.

The tire will not be manufactured by the makers of the Mitchell car, as originally reported, for the reason that the system for vaporizing the acids used in the process is extremely dangerous.

—

Canada's Big Duty on Automobiles

TORONTO, CAN., Feb. 26—Compilers of government reports in Canada have, most unfortunately, so jumbled "automobiles and automobile parts" in their tables of statistics that it is difficult to disentangle the skein and arrive at exact figures. Up to the beginning of the present year there were, approximately, 15,000 motor cars owned and operated in all Canada. Of these 2,646 were owned in Toronto, which is the largest patron of the automobile in Canada, owing to its fine streets and fairly good suburban roads. Montreal followed with some 500 cars. Although the population of Montreal exceeds Toronto by a hundred thousand, and there is comparatively greater wealth, the natural surroundings, the hilly and dirty streets and the abominable highways along the waterfront, as well as in every other direction, offer none of the attractions presented to the motoring enthusiast in Toronto. It will be useless to look for Montreal to be an enthusiastic motoring center until there are radical improvements in streets and highways. Hamilton owned in the neighborhood of 420 cars, mostly of the pleasure type. No other city of Ontario was shown to own above 100 automobiles. Canada imported over 6,000 cars last year, on which the duty was approximately, $10,200,000. This was more than $3,000,000 in excess of the duty collected on automobiles by the Canadian customs in 1910.

Up to September 1, 1912, when the automobile license department of the Ontario Government issued its semi-annual statement, there had been issued 11,730 licenses in this province. Of this number no less than 2,201 were issued to American tourists and others who reside close to the border, as at Detroit and and Buffalo, who take out licenses for frequent short pleasure trips across the border. From this source the Ontario Government collected last year $46,920.

Wood Artillery Automobile Wheels*

Concerning the Material of Which They Are Made, Methods of Construction and Testing, with a Few Comparisons with Wire Wheels

THERE seems to have been some interest displayed by American manufacturers of automobiles in regard to the so-called wire wheels of foreign make. The increasing attention that these wheels have been accorded has led us to make an exhaustive investigation into their merits, and I think it would be well, before discussing automobile wheels of the wood artillery type, to consider for a short time the relative advantages and disadvantages of the two types of wheels.

The members of the S. A. E. who made the European trip were given a demonstration at Coventry by Messrs. Rudge-Whitworth Company, Ltd., where they had the opportunity of witnessing an interesting experiment in regard to the relative strength of the wire wheel of the Rudge-Whitworth make and a wheel of the wood artillery type. In an English journal dated November 25, 1911, there appears an account of this test a chart showing the relative strength and deformation of the two different types of wheels being given. No mention was made of the size or quality of the wood wheel tested, and we have not been able to find out whether or not this wheel was one of American make of second growth hickory and assembled as the American wood artillery wheel of reputable make is assembled. There is no doubt whatever that this was a bona-fide test, and that some notice should be given by engineers to the results of it; but before any definite steps are taken exhaustive tests should be made to determine the relative strength of the two types under both dishing and direct loading conditions.

Wire Wheel Construction—The construction of the wire wheel is well enough known to the members of the society to render a detailed account of its make-up unnecessary, but it is easily seen that each member of the wire wheel is essentially a tension member and that any damage or shock to an individual spoke which would throw it out of line or loosen it in any manner whatsoever would immediately throw the wheel out of true. It is a well-known fact among engineers that a structure or body made up of tension members only is extremely liable to failure should one of its members be weakened or damaged in any way. This certainly applies to the wire wheel as well as anything else, and considering the hard knocks and blows that the spokes of a wheel receive under severe road conditions such punishment would be very likely to render a wire wheel useless. It has been the experience of the writer to note a case of side collision in which a car with wire wheels was hit on one side and from the impact of the blow given, although on the opposite side of the car, both wheels immediately dished and crumpled up as if built of so much match-wood. When one member goes they all go and a wheel built along these lines is certainly not the economical nor safe wheel for the average user of American motor cars.

American Use of Wire Wheels—The Electric Vehicle Company, of Hartford, experimented for over three years with wire wheels and, as far as the writer has been able to ascertain, were the largest users of wire wheels in America. H. P. Maxim, well known to all engineers, was on the engineering force of that company at the time and experimented exhaustively with the wire type of wheel. The first wheels designed were patterned largely after the bicycle wheels, but it was found that the rims were much too thin to hold up under the heavy tension submitted by the small bearing area of the nipples in which the spokes were screwed; it was found necessary to use a very heavy type of rim in order to obviate this difficulty. The spokes were staggered, both in the rim and in the double flange hub, which caused a sidewise motion or thrust to be given at times to the nipples in the rims. It was found in many instances that these nipples, once the spokes had become a trifle loosened, were forced from their seat in the rim and projected through the casing and into the tube of the tire, thereby causing much trouble.

Comparative Notes—Looking at a wire wheel on edge, or in the plane of rotation, one may see that the spokes diverge at quite an angle from the rim to the broad hub in order to provide lateral strength. The wire spokes thus diverging sidewise from the rims are subject to accidents on American roads from which wood spokes, keeping within the rim line, are entirely free. Furthermore, in a skidding smash or accident the wood wheel, even if it breaks, absorbs the shock and saves the machine, but when a wire wheel breaks, as described above, it goes with a snap.

Rust—It has been found extremely difficult to keep the wire spoke from rusting where it enters the rim, and as this is one of the most important points of construction in keeping the wheel true it is naturally a detrimental condition.

Cleaning—The problem of keeping a wire wheel clean would be also quite an item with the average American car owner.

Without considering the problem of weight, compressive strength, etc., the conclusion may be easily drawn that the wire wheel as now constructed by foreign makers is not the wheel for the American car, and it is on this assumption that the best wheel manufacturers of the United States to-day are going ahead with full confidence as to the continued use of the American-made wood artillery wheel.

Wood Wheel Material—The first item that enters into the construction of a wood wheel is, of course, the material. It has been the experience of wheel manufacturers for many years that hickory, either second growth or that part taken from the butt of the small forest tree, is best adaptable to the finer uses of the wheel manufacturers. Government tests have been made on the different varieties of hickory, of which there are some ten or more, and these experiments have shown that the manufacturers were working along the right lines when they used the so-called black hickory in all cases possible. Hickory in commercial quantities was once found in every state east, and in several states west of the Mississippi River. It has been the opinion of experienced timber buyers that the best hickory is found in and north of the Ohio River valley. The comment one often hears relative to the early failure of the hickory supply is, we think, without foundation, and emanates largely, on the one hand, from hickory users in this country in their anxiety to keep up the price of their goods and from foreign wire wheel manufacturers, on the other hand. From our observations, extending over the past twenty-five years, we firmly believe that there will be a good supply of suitable hickory for the manufacturers of automobile wheels when the present generation is gone, as we are now taking hickory from lands that we cut over for hickory twenty years ago, the last cut being of the best quality.

Hickory should be cut when the sap is entirely out of the tree,

*Paper read at the annual meeting of the Society of Automobile Engineers by C. B. Hayes, Associate Member of the Society.

and this fact makes the cutting season in the South a very short one; hence, Northern hickory has had a distinct advantage over Southern hickory, and the field in the North is becoming smaller and smaller. Hickory does not and never did form pure forest to any great extent; the trees are scattered here and there amid other timber. When an average stand of from 200 to 400 feet of hickory is found upon tracts of considerable size it is fully up to the lumberman's expectation. Hickory neither grows like any other commercial timber, nor can it be cut or marketed in the same manner. It is a peculiar wood in several respects—growth, properties, uses and marketing. Its combination of strength, toughness and elasticity has made it the world's foremost wood in vehicle manufacture. It offers supreme resistance to strains, twists and shocks. The severe thrust, twist and compression strains which automobile wheels must sustain demand spokes of absolutely the best material obtainable and for this work the manufacturer depends upon hickory. Hickory has many other uses, uses to which no other wood can be put, and it is the earnest advice of Government foresters that the users of hickory co-operate in methods of buying and cutting and thus endeavor to utilize every available part of the wood cut.

Hickory growing in isolated parts of forest tracts, little clumps far apart, has made the cutting and marketing of it one of doubtful profit to the large mill owner of today. The men who are cutting hickory are usually found to be those with small portable mills, moving their plant to the wood, in preference to hauling the wood to the mill. These men should be instructed as to how hickory should be cut to obtain the best parts possible for automobile wheels and also to utilize in the most economical way the remaining portion of the tree. The best material for spoke billets, rims, etc., is obtained from either second growth stock or from near the base of small forest trees. The sawing is done by mill men who move from place to place. The sawyer is paid by the 1,000 feet, and in his effort to turn out the greatest possible quantity of lumber, carelessly cuts a larger percentage of low-grade stock than is necessary. An expert sawyer can probably make it more profitable to the owner of hickory to sell to the wheel manufacturer than to utilize the hickory on his farm for building purposes. The up-to-date manufacturer of automobile wheels must have a force of efficient, practical, competent timber buyers in the field, capable of instructing and demonstrating to the farmer and small mill men the best and most economical way to cut hickory; and in this manner aid materially in the conservation of our hickory resources.

Drying—Hickory billets and strips for felloes are cut by the mill man and shipped to the manufacturer in that condition. The wood is in many instances, in fact, in nearly all instances, green, and necessitates scientific procedure in drying in order to obtain the best possible results from the material. It has been the writer's experience that steam heating is the most satisfactory method of drying the wood; starting in with a low temperature after the kiln is first built, gradually increasing to and holding at the highest point for some time, and then gradually decreasing until the stock is ready to remove. The spoke billets are then taken directly to the turning machine, where they are turned into what is called "dry-club" state—that is, the heads are not faced or mitered, but the barrels are turned to their finished shape. They are then given another course of treatment in the dry kiln, and are then ready for the finishing operation, which consists of mitering, facing, equalizing and sanding. The felloe strips are taken from stock as they come direct from the mill, are steamed with both exhaust and live steam, bent up to the correct form and then set to remain in dry kilns for twenty to thirty days, as the case requires. They are then ready for the planing, boring, rounding and sanding, after which they are ready for the assembly department.

Assembly—The spokes are then driven into the felloes and both halves inserted into a screw press and pressed on to a dummy hub. The wheels are then equalized—that is, both halves made of exactly the same height, and the outside circumference is brought down to the correct diameter for the shrinking of the steel band. The steel band is heated, placed around the wood wheel and the two pressed together in a hydraulic press. The dummy hubs are taken out and the wheel is sanded, primed or oiled, as the case may be, and the hubs and equipment attached.

Hub Construction—It might be well at this point to speak of the construction of the hub. Where the flange meets the barrel on one side of the wheel it is very often rounded—that is, the portion of the spoke which rests on the hub barrel and which gives the wheel all its support, is left free along one side before it touches the flange plate. This little open space gives chance for a little play, and the fulcrum which is afforded by the top of the flange and hub plate causes the spoke to work loose in the bolts; this can be avoided easily by designing the flange plates and hub plates so that they meet at a 90-degree angle with the hub barrel.

Compression Members Only in Wood Wheel—The wood artillery wheel put up conscientiously and thoroughly in this manner is an aggregation of compression members only, and as the wheel revolves each spoke receives its share of the direct thrust as the weight of the car comes upon it, and in straight-away running this is the only strain that the spokes are called upon to withstand. In going around a corner, however, or in sliding or skidding, the spokes are subjected to both tension and shear. As the spoke revolves the principal plane of stress is constantly changing, and instead of a spoke failing at its point of minimum cross-sectional area it fails a trifle toward the outer rim from that point, due to the revolution of the wheel and the angle that the principal plane is made to take with the planes of direct stress. The problem of the exact nature of the stresses on a wheel which is subjected to both longitudinal and lateral forces is a complex one, and time and space will not permit of thorough treatment of the subject at this time. But from the nature of the construction of a wood wheel it is easily seen that the spokes are much more able to withstand the forces indicated acting upon them than is the wire wheel of the type now manufactured.

Tests—There have been made recently rather exhaustive tests on wood artillery automobile wheels at the University of Michigan testing laboratory. These tests were made under the personal supervision of Prof. C. J. Tilden, C.E. Further tests will follow very soon, and reports on the same may be had by writing the S. A. E., or the author. These tests were made on a 200,000-pound Riehle testing machine for both dishing strength and direct loading, the elastic limit and ultimate strength being determined in all cases. The wheels were completely assembled and the results indicate the relative strength of the different size wheels. It is the intention of the writer to conduct further tests along these lines in the very near future. Suggestions in regard to the method of wheel support and loading would be greatly appreciated, as it is intended to make tests that will show absolutely what a wheel will stand under actual runnning conditions.

Varnishes for Iron and Brass

AMONG the many sorts of serviceable varnish which may be used to protect iron surfaces against atmospheric or other chemical influences, black varnish is most frequently used. This material is easily prepared by melting common asphalt in a kettle or boiler and, while stirring the mass, adding crude oil until a sample taken of the mixture shows suitable varnish consistency after cooling. By heating the varnish it may be dried in the shortest time without fearing to ruin it, as this blick iron varnish resists high temperatures very effectively. It is as black as pitch and is also as elastic as may be desired for any purpose.

This varnish may be applied to brass as well as iron surfaces. It is, however, sometimes desired to use a varnish other than black, and in these cases, especially where high-polished brass or zinc surfaces have to be dealt with, the so-called gold varnishes will be found of advantage.

System Makes Car Building Profitable

Every Minute Must Be Accounted for to Insure Efficiency

THE ENORMOUS QUANTITIES of material handled and the large number of men employed in a modern automobile factory call for special means of supervision, if they are to be controlled at all. That this is a necessity if success is to be reached, is self-evident to the mind of every thinking man. But the great problem consists in the laying out of a system elaborate enough to take in all operations occurring in a factory, and yet flexible enough so as not to be useless when an emergency arises by the introduction of new factors. Furthermore, a still greater problem lies in the question of finding the men capable of handling and enforcing the system.

Some decades ago the idea of such vast organizations as they exist now might have seemed strange to most men, but despite this it came true. The automobile industry today is the fifth largest industry of this country. This fact is proof of its strong foundation and real value, and if to the outsider an automobile factory seems to be standing on a foundation of numberless complications, this is only because he is unable to see the threads which bind one department to the other and permit of economic and efficient operation of the works.

Details Must Be Considered

THE machine tools and workers for automobile production being given, it remains to find a way of keeping track of all operations taking place in the manufacture of the product. The great manufacturer knows that no detail in factory operation is small enough to permit of being ignored, nor is any feature so important as to warrant concentrating all his attention upon it. To weigh the importance of every factor of manufacture and to control its cost with a care proportional to its import, is the problem facing the manufacturer of today.

There are two ways of keeping track of the cost of factory operation. One is to use all the material and labor necessary to keep the mechanism of manufacture running, to pay for this material and labor as it is used, and to prepare one comprehensive summary of the situation at the end of each fiscal or operating year. The second process consists in recording practically every pound of material and every foot-pound of energy, human or mechanical, which are used in the operation of the factory, at the time of their use; this process permits of reviewing the situation once a week.

The first way is undoubtedly the simpler of the two. Whoever is concerned with the handling of labor or material records the amounts used, and an inventory is prepared at the end of the year by a comparatively small number of clerks. Then the manufacturer may introduce whatever alterations he deems advisable or necessary, and after a period of trial judge whether it was an improvement or not. This system must obviously neglect many details, lest the final summary be too formidable.

The second arrangement permits of recording every little detail entering into factory operation, the large amount of record material thereby accumulated being segregated weekly or monthly, in fact continually. This keeps the system elastic, since the cost of every department and sub-department is easily calculated, indicating where cost may be reduced and profit increased.

As a matter of fact, if the manufacturer of an automobile wants to produce a product equal in quality to that of a competitor, but at a lower cost, and sell it at a lower price than the other maker, he must introduce the second system, because by its use, and by no other means, he is enabled to analyze the situation obtaining in his factory, to see where small details can be improved upon and introduce changes which may make it possible to reduce the cost of production to a remarkable extent.

Knowledge is power, and a maker who is familiar with all the conditions in his factory is also in a position to improve them in many ways. This familiarity must be paid for by the employment of a force devoted exclusively to the collection of the record material. The number of these employees bears a definite ratio to that of the producing laborers employed in the manufacturing plant.

The Maxwell-Briscoe Motor Company, of Tarrytown, N. Y., employs about 2,000 men in the production of Maxwell cars in its three factory buildings. More than 100 men, partly working in the office and partly in the shop, are continually occupied with the work of collecting and arranging the data concerning this work, while another force of men study the results of these endeavors and, using them as a basis, work out the advisable changes.

Three great groups of expenditures make up the cost of factory operation: labor, material and overhead expense. In the accompanying table the various details of these great divisions are shown. Each of these three groups may be easily divided into two classes of expenditures, productive and non-productive ones.

Beginning with the cost of labor, the workers or employees are classed under two headings. They are divided by the system of paying them, part being on salary, and part on a variable basis of payment. The second class comprises those occupied with the work done upon automobiles and old cars turned into the factory for repairs, as well as those working the plant and equipment. In a word, this class of workers comprises the skilled laborers and their helpers. These employees ring in and out, using a time clock for the purpose. Shop hours are from 7 to 12 a. m., and from 1 to 5 p. m. The salaried workers, that is, the office force and foremen, inspectors and factory clerks, are paid weekly. The office workers' hours are from 8 to 12 a. m. and from 1 to 5 p. m., giving a 48-hour week, while the factory employees' week has 54 hours.

Keeping Track of Workmen's Time

TO keep an exact record of the time each laborer is at work, he is equipped with two cards. One is punched by him on the stamp of the time-clock, when he comes in and leaves twice a day. In this way the total time devoted by him to factory work is recorded. The clock card is numbered, each worker being given a number when he enters the company's employ. The time card never leaves the rack except to be punched, and at the end of each week the card used by each worker during that period is taken to the office and the total number of hours as recorded by the time stamp added.

This arrangement informs the office of the total working time of each man during the week. To record the distribution of the men's time on the various jobs done by them, factory clerks continually circulate among the men and watch their doings. There is a considerable number of such factory clerks at the Maxwell plant, and each devotes his attention to a specific sort of work. The factory clerks carry orders which are issued from the production department of the factory. Each job done in the factory is done on a written order, a copy of which is carried by some factory clerk. Each clerk has a class of orders assigned to him in the morning; these orders are of such a nature that the clerk is kept in one department practically all the time. There he observes the operations of the workers, and, as they start on a new job, he enters the starting time and the

name of each man on his job order. Likewise, the stopping time of each man and the time of finishing the job is noted on the job order.

Incidentally, this system provides a method of checking the total time recorded on the workers' clock cards. Besides this type of card, there is in the office a second card for each man, which is numbered with the number assigned to him and appearing on his time card. In this second card the job times of the man are entered by a factory clerk, and their total must check with the total time of the clock card for the week.

There are seven classes of orders used in the Maxwell factory, each for a special purpose, or rather for a class of purposes. Each class of orders is issued in consecutive numbers.

The first class of order is the Production order. It is made out for the manufacture of the company's products for parts as well as for cars. This class of order is also used for the manufacture of those parts which are not sold on the account of the Tarrytown factory, but made by it for some affiliated company of the United States Motor Company, which may not have the facilities for the manufacture of that specific class of part.

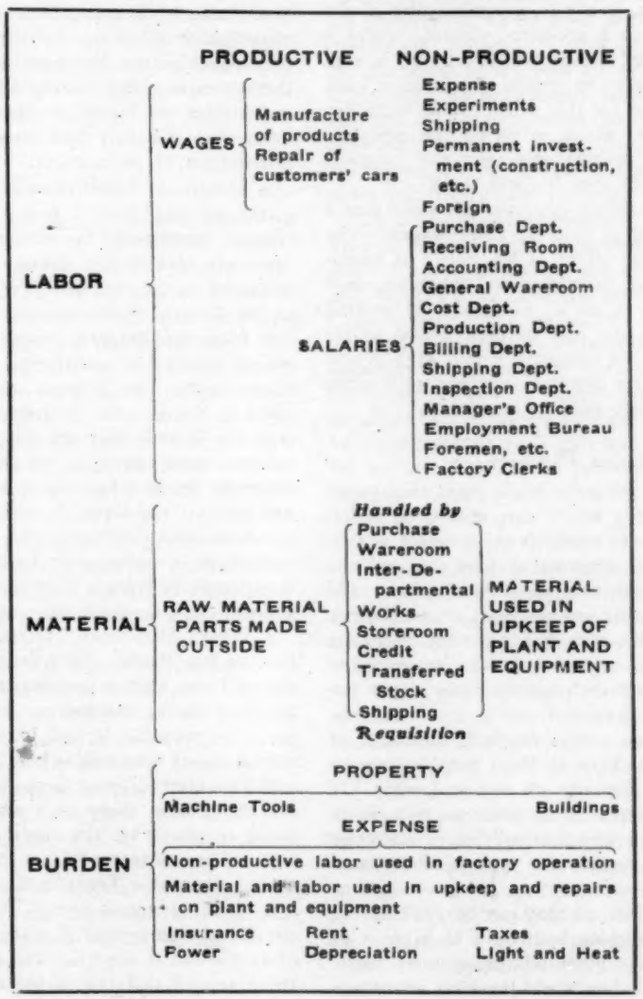
Expense orders are issued to cover expenses which are necessitated by the upkeep work. Under expense are understood, in this case, the wages of the men occupied in keeping the plant and equipment in good repair at all times. This work is classed under the heading non-productive.

The third class of orders are Repair orders, issued to arrange for repair work to be done on the used cars of customers. Such cars are frequently sent to the factory, which consequently maintains a very large repair department. This repair work is of a productive nature, in that it is charged to the customer in much the same manner as a new product bought by him from the company.

Besides these three there remain four more classes of orders. Permanent Investment orders are issued for work done in the construction of additional buildings. The labor of constructing new shops and rails is ordered on this type of order, as well as all work expended in making a new part of the company's property, or a permanent asset.

Experimental orders constitute the fifth class. Not being directly productive from the factory viewpoint, they, too, are classed under the heading non-productive. Besides the tests made on the material and parts in the shops, each newly constructed model is thoroughly tried out before being introduced to the public. The trials comprise work of all kinds, done on all kinds of roads and under very trying conditions, and whatever work has to be done in connection with these experiments is ordered on Experiment orders.

The sixth class of orders are called Foreign Production orders. This class of work is made out for a series of operations not done by the workers of the Maxwell company at its plant; but because the value of this work is very considerable, and because the orders call for actual production, the amounts involved are considered as part of the labor expenditure. Foreign Production orders are used for the following kind of transaction: For the production of certain parts the Maxwell company buys raw material from a company producing the same, and has it shipped by the latter to a second company which does on it such work as specified by the Maxwell concern. The work having been done, the last named company orders the product to be shipped to a third concern, which again works upon it. If this process brings out the finished part, the latter is shipped to the Tarrytown plant, while otherwise it may be sent to a fourth concern to be prepared for going into the car. As the work is done outside of the Maxwell plant the company has no direct control over it and its factory clerks do not watch its progress, but the amounts charged by the concerns working upon the parts are all added and noted on the order. Thus a number of charges are assembled on one order, making up a vital item in the productive labor cost of the cars manufactured at the company's plant.



Distribution of Cost Items in the Maxwell Factory

The seventh order is the Shipping order. It is made out by the factory manager's office, and accompanies every shipment of any kind or size, excepting new cars. The time of the wage earners busy on shipping work is noted on the shipping orders. New automobiles are shipped on specific orders, on which the time required by the laborers in doing that work is carefully recorded.

The factory clerks have files for all existing orders which are kept in numerical order. As each job is worked upon, the factory clerk in charge of the order enters on it the itemized time it consumed, and at the end of each week, the total time appearing on the finished-job orders is noted and the number of hours is checked against the total of the payroll of the factory for the week.

A study of the requirements of efficiency has taught the management that the apparently simple procedure of using exclusively either the time or piece rate of paying for labor is not in line with the general endeavor to turn out a high-class product in an economical way. Experience showed that factory work, uniform as it may seem to the outside, is composed of a number of different operations, and that only by the maker's adapting himself to and making use of this fact can a high degree of operating efficiency be reached.

As things stand at present, the Maxwell-Briscoe Motor Company pays its men in three ways. One corps of men does day-work, which is paid per hour, each man receiving a certain rate of payment per hour of work. The second way of paying

is by piece, each worker being paid a predetermined sum of money for each piece of part turned out by him. The third system is payment on a premium basis. The basis of payment depends on the nature of the product made by the respective laborers. Day-work is done mostly where the quantity and quality of the product may vary only within narrow limits.

Piece work is done where the energy and attention of the man plays a specially important part. This refers to the manufacture of parts which is not as automatic as that of many other articles. In the case of the first mentioned, the articles are made semi-automatically; the quality as well as the quantity of the product may vary greatly, according to the way the worker goes about his work. In order to let him do the best and all he can, he is paid per piece made, his rate being fixed by the quality of his work. In this way he is the maker of his own fortune as far as pay is concerned.

The third basis of payment is, in a way, a combination of the first two. A worker working on a premium schedule works a given number of hours each day, during which time he is supposed to turn out a given number of pieces of a certain part. He is paid a predetermined wage for this work. If he turns out more than the normal number, which is called the premium basis, a certain profit accrues in this way, and the company agrees to give him half the profit thus brought forth.

This is easily elucidated by a simple example. Suppose that a man works 9 hours a day and is paid $3 daily wages. The premium basis of his work is 100 pieces of his article of manufacture *per diem*. If he makes 100 pieces and no more, each costs the company $3 ÷ 100 = 3 cents. If instead of making 100, he would make 150 pieces, the cost of each would be reduced to 2 cents. In this way the company would save 1 cent per piece produced, and allowing him 1-2 cent for each piece made, would pay him $3.50 for the work accomplished.

Determining Basis Payment

IT is obvious that in a factory using the triple basis of payment it is quite important to decide which part should be manufactured as day, piece or premium work, to the greatest advantage of the establishment. It is likewise obvious that no one except a practical shop expert can determine these points; and recognizing this, the Maxwell plant has a special shop-efficiency man, called the speed boss. This man is a practical mechanic, born and grown up in the shop, so to speak. By many years' experience he knows exactly what each machine may do or not do, and it is his business to see that each tool is used most efficiently. He is in the shop at all times, watching the work of the men on the machines and working on them himself to positively determine the maximum capacity of the equipment. If he finds that a machine is not exploited as much as it ought to be, he shows the worker in which way it may be more efficiently used, and eventually advocates putting this type of work on a premium schedule.

In this way the company realizes all that can be realized out of its equipment and laborers, keeping both on a high plane of efficiency and the workers of the plant willing at their work. The premium basis of payment has the additional advantage of showing which employees come up to a fair average of efficiency, permitting of advancement of the able and elimination of the unfit.

As to the advancement of the employees, the foregoing elucidations show that a great deal is left to their own ability and ambition, and it is also up to them to demand an increase in their rate of pay when they think it just. If a man desires a raise, he goes to his foreman and, saying that he considers himself worth a better pay than he is drawing at the time, asks for an increase. If the foreman thinks that the man deserves a raise, he makes a recommendation to the factory manager's office, and the thing will go through; otherwise, he tells the man that he can either continue to work on his present basis of pay or leave. This process of negotiation is normal in the plant.

A great factory, being a small state in itself, is subdivided into many departments, and, to keep control of such a vast organization, the men occupied with this work use a system comprising a great number of forms, blanks, orders and requisitions. More than 500 forms are used in the Maxwell-Briscoe factory, new forms being drafted by the factory accountant as the need for them arises. To illustrate this army of blanks is not possible here and will not be attempted.

Six Kinds of Requisition Used

REQUISITIONS are made out for all material used and handled in the Maxwell plant. They constitute a flexible stock record, accounting for every ounce of raw material and every finished part in the establishment. There are six principal requisitions, the uses of which are described herewith.

1. Purchase requisitions. These are filled out by the General Storeroom, when its stock of any material, part or tool runs low. Like orders, requisitions are issued in series. The purchase order filled out by the manager of the General Storeroom goes to the Purchase department, which then makes out the purchase order on the basis of the requisition. Purchase requisitions are made out by no department except the General Storeroom, which is thus responsible for the receipt and proper distribution of all material.

2. Storeroom requisitions. The heads of the various departments use this class of requisitions to obtain material from the General Storeroom for manufacturing purposes. The requisitions are filed in the storeroom after the materials have been delivered to the respective departments, thus serving as receipts to the General Storeroom for the materials distributed.

3. Inter-departmental requisitions. These forms are used where material is transferred from one department to another requiring it. This happens when a department, after having applied to the General Storeroom, is not delivered the materials it needs, because they are not in store there, obtains them from another department having a surplus stock. In every case, however, the first application is made to the General Storeroom, and only if the latter is unable to give out the required material, to another department. The transaction being closed, the requisition is turned over to the General Storeroom, where the department delivering is credited and the department receiving charged with the material transferred from one to the other.

4. Works Storeroom Credits. When a department head finds that he has drawn more from the store than he requires, he may fill out such a requisition and return it with the surplus to the General Storeroom, where his department is credited with the material turned back. An account of every department's use of materials is kept on file in the General Storeroom.

5. Transferred Stock requisitions. Besides the main or General Storeroom there is a smaller storeroom at the Maxwell plant, which serves the repair department of the company. If material is transferred from the stock of one storeroom to that of the other, this Transfer Stock requisition is used.

6. Shipping requisitions. When an order has been made out for the shipment of material out of the factory, this type of requisition is filled out and turned over to the General Storeroom against delivery of the material called for.

Overhead Expense Is Included

BURDEN or overhead charges which must be included in the cost calculation of the factory's product comprise all cost which cannot be traced to any particular job, but is distributed over all jobs done in the establishment.

The items constituting the burden of a factory can be classified under two great headings, Property and Expense. Property comprises the first cost of all durable installations or permanent investments, such as buildings and other structures, as well as machine tool equipment of the factory, cranes and derricks, conveyors and all equipment depreciating at a rate of 10 per cent. a year.

Expense covers a variety of continued cost items, chief among which are the material and labor used in the maintenance and

repair of the manufacturing plant and equipment. Replacement of worn or destroyed parts of plant and equipment falls entirely under this heading. Furthermore, all non-productive labor used in factory operation, such as that of the office force, factory foremen, inspectors and clerks, must be accounted for as overhead charge. All the material used by these workers in the pursuit of their work is also part of the burden. Power, while most of it is directly productive, must be charged up as overhead, because its use on each particular job cannot be measured; likewise, heat and light are classified as burden. Beside the depreciation of plant and equipment, insurance, taxes, rent—if there is any—and extras must be included in the overhead charges.

The total overhead expense for a given period and the total cost of productive labor and material for the same time bear a definite ratio, giving the amount of overhead charge which must be added to the direct production cost of the product. For instance, if the ratio between direct cost and overhead is 10 to 9, then 90 cents must be added to every dollar of production cost to give the total factory cost of a product.

Production-Overhead Ratio

WHERE an elaborate system like that of the Maxwell exists a production-overhead ratio may be worked out for every department of the factory, so that there is another way of seeing where the operation of a department may be improved.

The salaried force of a plant consists of the non-productive workers which are enumerated on the table on page 607. They all form a chain, in that all material or the forms used in handling it passes from one department to the other without ever returning to a department it has already passed through. As the functions of each department are looked into, one cannot help marveling on how each link engages the other, none being superfluous, nor too strong nor too weak to do its work. Excepting the foremen, factory clerks and inspectors, and the employees of the employment bureau, all other departments are occupied with the handling of material directly or indirectly. The manager's office and the accountant's department are necessary to keep the entire machinery under control, and to adjust its operating relations when necessary.

The Purchase department, receiving a notification from the General Storeroom in regard to the requirements of the latter, places its orders with the makers or dealers of the material needed. On the order the terms and date of delivery are stated, and to see that the dates are kept the Maxwell company employs a force of men who follow up the orders. The follow-up men correspond with the makers of the parts or material ordered, and eventually go to their factories to hasten delivery. When delivery is made, the goods received are brought to the Receiving Room. The shipper of the material accompanies the goods with a packing slip enumerating the contents of the shipment and made out when it is charged before leaving his establishment.

All Requisitions Are Priced

THE Purchase department files a copy of its order with the Receiving Room when it orders the material from the outside maker, and when the latter sends the goods to the Maxwell plant, the Receiving Room checks the material received against the packing slip of the shipper and the copy of the original order. Thereupon, the Receiving Room issues a Receiving Memorandum, stating in detail the nature and quantity of the material received, the name of the shipper, date of receipt, date of way bill, date of pro bill, and the freight charges paid. The Receiving Memorandum is then turned over to the Purchase department, where the data appearing on it are recorded on the Purchase order.

The shipper's invoice arriving meanwhile, after having been checked in the Purchase department against the order for which it is rendered and certified for price and terms as stated on the order, is sent to the Accounting department. There the invoice is matched with the Receiving Memorandum, and, if the two agree, the Accounting department makes payment in due course.

The material having thus been officially received and taken over by the company is then sent to the General Storeroom. This department keeps a complete record, by part numbers and names, properly classified, of all the material received and disbursed. The latter is done only on requisition, and, all requisitions being filed in this department, a complete record of the material handled at the plant is kept in the General Storeroom. The stock account of the department is kept correct by entering on it the materials received from the Receiving Memorandum, and the materials disbursed, from the requisitions.

All requisitions issued are priced by the Cost Department, if the material is to be used non-productively or on Permanent Investment orders. It also prices all shipping orders either by compiling direct cost of production and overhead charges or, in the case of standard products of the company, by specifications. The department also prices such requisitions as are used on production work not covered by settled specifications, for instance, repairs done on customer's cars, or work done for other factories of the concern.

The requisitions for material going into cars are never priced. This is done to simplify matters, the cost of each part and the labor involved in making the product being determined *a priori* and expressed by standard price specifications.

All orders which go to the factory, except those for work done on permanent investment, are issued from the Production department. Permanent Investment orders are made out by the General Property department. The Production department, on all orders it issues, enumerates the operations which are to be performed on each part and routes the work done on it in the various departments through which it passes. Each of the departments is furnished with a copy of the order.

Inspectors Busy in Factory

AS the material passes through the various manufacturing departments it is being inspected by members of the Inspection department, experts in the field. These men test the incoming material, and reject unsatisfactory shipments; they also eliminate poor material detected in the process of manufacture.

When a job has been completed in the factory the product is either sent to the Shipping department to be sent away or to the General Storeroom to be held in stock; in either case it is accompanied by a finished-work report. This report shows the order number, the quantity of products completed and the name and part number of the part. Where a completed piece of work is not sent to either the Shipping department or the General Storeroom, but remains in process, to be incorporated in a car later on, no finished-work report is given out.

The Shipping department of the company makes shipment only on receipt of Shipping orders issued by the office of the manager. In shipping the details of the instruction on the shipping order are followed closely.

All bills which are rendered for material, parts and cars shipped out of the factory are made out from a shipping order and bear the number of the same. The bills are made out by the Billing department, and every shipping order issued is covered by a bill rendered for the goods, no matter whether the shipment is made on consignment, charge, on memorandum or without charge.

The Employment Bureau of the company is kept up for obvious reasons. The workers, especially those working on a day-work basis, do not consider their position a lasting one, and in order to be on the safe side in any event the company keeps on file the names of applicants for various kinds of work. If one day a worker does not appear without notifying the company in any way it is a fair conclusion that he does not care for his work any longer, and consequently must be supplanted by another man.

Digest of the Leading Foreign Journals

Ready Factory Tests for Steel—Simple Machine Giving Figures for Brittleness by Impact and Replacing Uncertain Methods

THE system for controlling the selection and treatment of steels established at the works of the French Society for Mechanical Construction, at Denain, presents features of general interest. It has been the object to devise methods at once sufficiently precise to afford a complete definition of any given grade of material and sufficiently simple to be applied rapidly, if necessary, to machined articles. The Brinnell method of testing for hardness has been found satisfactory in these respects. It consists, as is well known, in subjecting the metal under test to pressure from a steel ball of known diameter (5 or 10 millimeters) and under constant load (705 to 3,000 kilograms), and measuring the diameter of the imprint left by the ball. This diameter is constant for each grade of metal, and, when it is known, the tensile strength can be read off immediately from a card giving graphically the scale of relations.

But aside from knowing the hardness and the tensile strength, it is also indispensable to know the metal's ability to resist shocks and vibrations; to know, in other words, its degree of brittleness. For a long time the elongation observed at a tensile test has served as a basis for estimating brittleness, but while small elongation points with certainty to a brittle structure, a normal elongation, on the other hand, is not a safe indication of normal ability to resist shocks, and it was for this reason that in many places folding, bending, impact and torsion tests were adopted in addition to the tensile tests. These tests, however, are complicated, and the results depend often upon the ability of the operator. Their value for precise comparison of different metals is therefore small. There has been need of a method expressing brittleness in figures. The fracture by shock of notched bars of constant section has been found to afford such a method, and, thanks to the employment of a rotary ram for a test of this nature, it is now possible to determine in each case the number of kilogram-meters absorbed in the fracture of the test piece.

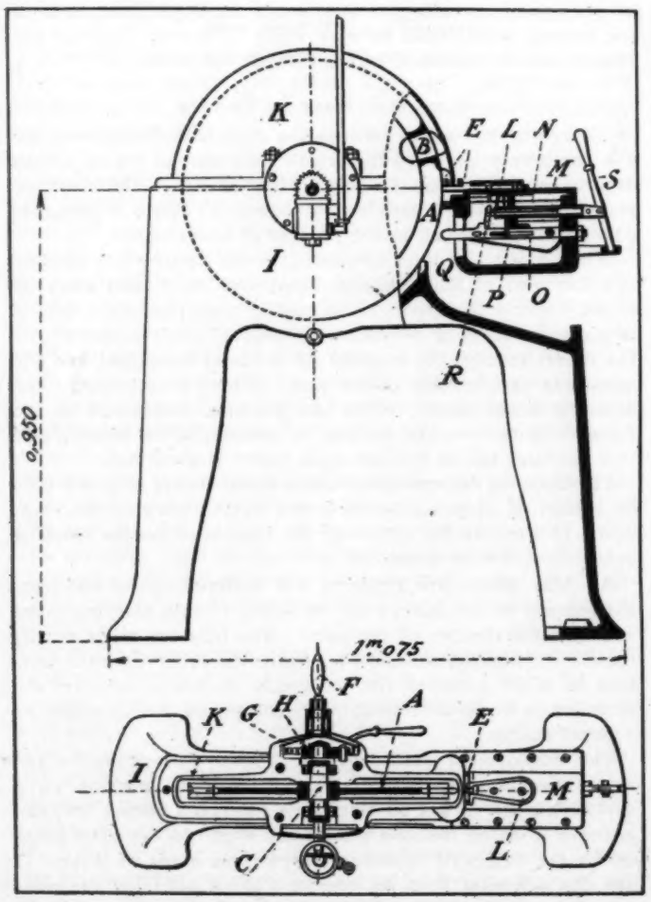


Fig. 1—Side and plan views of the 60-kilogram-meter rotary ram which, together with a Brinnell tester, furnishes a complete steel testing plant for factories. (For reference letters see page 611)

Graphic Ticket for Each Steel

COMBINED with the Brinnell ball test, the rotary ramming test permits a rapid and simple definition, in figures, of the properties of a metal, and particularly allows one to follow each shading in the properties of steel in its various states of heat treatment. At the works referred to, where these tests have been established, a ticket is made up for each grade of raw material, giving for each form of heat treatment one microphotograph of the texture, one of the fractures made on the rotary ramming machine, one of the imprints of the Brinnell balls on a polished sample, together with the numerical figures of hardness and tensile strength represented by these tests, and three microphotographs showing a polished sample, first, in its natural state, secondly, as attacked by picric acid, and, thirdly, as attacked by picrate of soda. These tickets are permanently installed in the shops and in the drafting rooms, so as to supply a concrete and complete conception of any metal which may be in use or under contemplation, to take the place of the more or less vague recollection of its properties which the engineer in charge may possess. A complete collection of these tickets was exhibited at the recent exposition at Turin, and also a set of the testing apparatus.

The rotary ramming machine is designed with compactness, durability and rapidity in operation especially in view. It comprises, in principle, a flywheel which, turning at constant speed, causes the fracture of a test bar by means of a knife fixed upon its circumference, the test bar being brought under the knife at the desired moment by an automatic release movement. The loss of momentum in the flywheel is determined by simply taking readings, before and after the shock, on a graduated scale, or else by examining a curve drawn by a special registering machine. There are two models of this apparatus; one giving normally a shock of 60 kilogram-meters, the other one of 200.

The form of the notch in the test bar has been much discussed; but remains arbitrary, so long as it is always the same throughout a series of tests the results of which are to be compared. The bars usually admitted for the 60 kgm. apparatus are the square bar of 10 by 10 millimeters, as defined at the Copenhagen congress of 1910; the bar of 10 by 10 mm. with a rounded 2-mm. notch, as adopted for the laboratory of the *Department des Ponts et Chaussées*, and the Frémont bar of 8 by 10 mm. with a square 1-mm. notch. The 200-kgm. ram

usually operates upon a 30 by 30 bar of the Copenhagen type in which the section of the fracture is reduced to 30 by 15 by a notch of 2 mm. wide opening into a hole having a diameter of 4 mm.

The construction of the 60-kgm. ram is shown in Figs. 1 and 2. The data of the apparatus are:

Momentum accumulated in the rotated mass ..... 60 kilogram-meters
Velocity of the impact (corresponding to a free fall from a height of 4 meters) ..... 8.80 meters per second
Number of revolutions per minute, corresponding to this effect 293
Encumbrance: length, 1.075 meter; width, 0.32 meter; height at shaft, 0.95 meter.

The steel flywheel A which is balanced perfectly, after being made, rests with its shaft C in two bearings, the friction being minimized by bearing balls except at the moment when the knife B strikes the test piece E, when parallel bearings of sufficient area take the thrust. [Seemingly, the parallel bearing member acts only for an upward thrust.—Ed.] The flywheel is turned by hand, through the crank F, a train of gears G and a ball clutch H which permits the wheel to continue its movement when the operator releases the crank and the latter is at rest. The device is mounted on a cast-iron base I of sufficient mass to absorb the reactions and serve at the same time as support for the anvil in which the test piece is secured and for the different accessories. A protecting hood K incloses the flywheel as a precaution against accidents. The test bar E is placed on the anvil J, which is beyond the radius of action of the knife, and is held in place by the permanent magnet L, which is mounted upon the movable plate M.

This plate M is constantly pushed toward the flywheel by a spring N, but is normally prevented from moving by its engagement with a sliding rack O provided with a retractor spring P. Moreover, the movable part Q of the rack is held away from the flywheel by interior spring which at the same time pushes back the rod R and the operating lever S. The latter is thus made to take an inclined position symmetrical with that shown in Fig. 1, and in this relation of the various elements the rotary movement of the flywheel is absolutely free, as there is no obstacle in the orb of the knife. If now the operating lever is pushed into the position shown in the illustration, while the flywheel has been set going at its operating speed and the crank released, the lever takes along with it the rod R and the movable portion Q of the rack, and the extremity of the latter comes under the knife B, which trips it up around its pivot, thereby causing the unfastening of two retaining hooks, liberating plate M, which immediately, under the action of its spring, pushes the test bar into position for shock, while the movable portion of the rack is shoved back, leaving the space under the test bar open.

Adapted for Factory Routine

As the release actions are instantaneous, and the movable pieces get into their positions long before the knife has finished another revolution, there is a certainty that the shock of the knife against the test bar will always be produced correctly.

To place the apparatus in position to receive a new test piece it is sufficient to push the operating lever S back to its starting position, as this carries the movable plate with it and the latter's re-engagement with the rack takes places automatically.

The indicator device used with this apparatus comprises a small centrifugal pump driven by the shaft of the flywheel and applying its pressure against a column of colored fluid in a vertical glass tube secured to a double scale of graduations. The level of the fluid indicates, by one of the scales, the velocity of the flywheel and, by the other, the momentum corresponding to this speed. By simple readings before and after the shock the work absorbed in the fracturing of the test bar

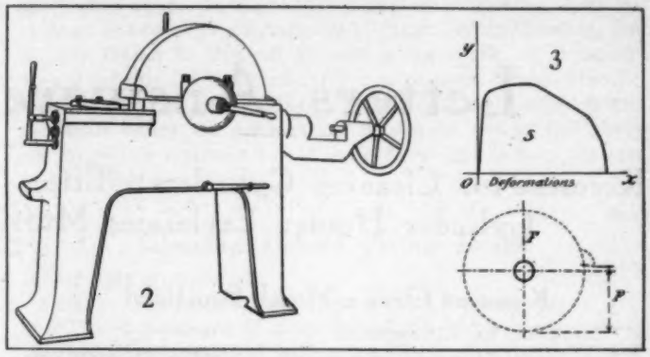


Fig. 2—Sketch of apparatus comprising 60-kilogram-meter rotary ram and Brinnell testing device for determining hardness and tensile strength
Fig. 3—Diagrams representing the work absorbed in fracturing a test bar by shock in rotary ramming machine

is ascertained. The centrifugal pump has been chosen to actuate the indicator because it sends the liquid to a height proportionate to the square of the speed, and, as the momentum of the flywheel is also proportionate to the square of the speed, this makes the graduation of the two scales regular and easily read.

The frictions of the movable parts are without appreciable influence on the results. An analysis of what goes on under the knife at the moment of shock shows that the work absorbed at that moment falls under two divisions: (1) a progressive force F (see Fig. 8) producing the deformation of the bar up to its elastic limit, followed by a variable force acting until the fracture or complete folding of the bar occurs, and (2) the distance traveled by the knife during this action. The diagram, Fig. 3, represents this action.

Analysis of Frictions Involved

As to the frictions, at the moment of the shock there is produced in the bearing of the flywheel shaft a reaction equal to, parallel with and acting in the opposite direction of the force applied against the test bar. The work of the friction is also composed of two elements directly proportionate to those of the work absorbed by the knife. They are: (1) A frictional resistance which is at any given moment equal to the force applied against the test bar multiplied by the coefficient of friction in the wheel shaft bearing, and (2) the distance traveled by the bearing surfaces, which is equal to the displacement of the knife multiplied by the ratio of the radiuses.

As the friction takes place between surfaces of hardened steel which are perfectly polished and lubricated, its coefficient is lower than 0.02. And the proportion of the distances is smaller than 0.1; so that the whole amount of work absorbed in friction is less than $0.02 \times 0.1 = 0.002$ of the work absorbed by the knife. In practice this is negligible.

The 200 kilogram-meter ram is normally operated at a speed of 229 revolutions per minute and the mechanical dispositions are similar to those described for the smaller machine. It is provided, however, with a registering indicator of momentum actuated from a magneto which is gear-driven from the flywheel shaft and the current of which varies with the speed and acts upon the registering receiver, and the hand of this instrument displaces itself before a graduated scale giving the momentum corresponding to each speed by simple reading. A second hand, provided with a special pen at its end, is moved over a roll of paper which is unwound by an automatic movement, and traces upon it a curve representing all the phases of the test.

The automatic movement of the paper is obtained by means of current from a storage cell, this current being thrown into an electro-magnet at each turn of the magneto by means of an interrupter mounted upon the magneto shaft, and the armature of the electro-magnet by its displacement makes the unwinding-gear for the paper roll advance one tooth.—From unfinished article by J. Netter in *La Technique Moderne*, February 1.

Letters Answered and Discussed

Kerosene for Cleaning Cylinders; Effect of Weather on Carburetion; Oil in the Cylinder Heads; Explaining Muffler Explosions; Sliding Gears, Etc.

Kerosene Once a Month Beneficial

EDITOR THE AUTOMOBILE:

[3,038]—I would like to ask through your letter department some questions regarding the use of kerosene in the cylinders. I have read frequently that it is well to use kerosene as a cleaner, to remove carbon and keep the motor in good running order; but at the exhibit of the manufacturers of my car at the Chicago show, I was told not to use anything as a cleaner, just to use good oil and that would be all that was needed. I am not inclined, however, to put full confidence in this statement. I would like an opinion as to the use of kerosene. If it is to be used, how much should be used at a time? Should it be put in while the motor is hot or cold? If put in while the engine is hot, should it be then started and allowed to run a short time or allowed to stand idle after the application?

L. F. PONTIOUS.

Adair, Ill.

Kerosene should be used once a month regularly. The method of application is as follows: Drain out the oiling system, replace the oil with kerosene and allow the motor to run for 15 seconds. Then pour a cupful of kerosene into each cylinder-head and let stand over night.

Does Weather Affect Carbureter?

Editor THE AUTOMOBILE:

[3,039]—Would you tell me, through THE AUTOMOBILE, if a carbureter is affected by the weather and if more or less air is required on a damp day than at a time when the weather is clear and dry?

I think my car runs better with an increased supply of air when the weather is damp. That is to say, during such times as the barometer and hygrometer have low readings.

H. B.

Lewisburg, W. Va.

There is no doubt that the different conditions of the atmosphere affect the working of the carbureter materially. This is the case because there is less oxygen in the air during the damp periods than there is in the same quantity of air during a period of dryness and hence it takes more air to make a mixture that is as powerful as required. On the other hand, the air is denser and is heavier for the same volume. The moisture in the air contains oxygen and hence the quantity which is lacking in the air itself is present in the moisture so that the mixture is apt to be even more explosive. This accounts for the better performance of a car when the air is damp.

Heating Values of Various Gases

Editor THE AUTOMOBILE:

[3,040]—Would you kindly give me a little information of the heating powers of some of the fuels used in internal combustion motors? I would particularly like to know the B. T. U. per pound of kerosene; $C_{10}H_{22}$; gasoline, C_6H_{14}; alcohol $C_2H_4O_2$ and acetylene, C_2H_2.

CHEMIST.

Brattleboro, Vt.

The average heating values of the products you name are kerosene, 22,000; gasoline 18,000; alcohol 20,000 and acetylene, 21,500; each of these being in British thermal units per pound.

It Was Not Graphite, but Carbon

Editor THE AUTOMOBILE:

[3,041]—In your issue of January 25, page 310, in the second paragraph under the subhead Lubrication System of Sleeve Motor, in speaking of a series of concentric grooves above and below the exhaust slots of the sleeves, as well as on the exhaust side of the cylinder, you say that the grooves fill up with graphite produced by the cracking of the lubricant at high temperature.

I am very much surprised at your statement that these grooves fill up during the continued performance of the motor with graphite produced by the partial cracking of the lubricant at high temperature. Is it not astonishing that graphite should be made in this way from the lubricant? Lubricating oil is a hydrocarbon, approximately 80 per cent. carbon and 20 per cent hydrogen. When the oil is "cracked" or split up chemically the carbon is freed and may deposit, but this carbon is not graphite. It is non-graphitic carbon of an asperous nature, not of an unctuous nature such as is suitable for lubrication, like graphite. Under these circumstances I feel you are wrong in claiming that there were graphite accumulations in the groove. I quite agree with you that graphite is a desirable lubricant. It is very desirable if of highest purity, unctuous and soft, but you never find graphite of this or any other character in grooves in the Knight motor unless you use a lubricant that contains it in diffusion or suspension. Right here may I be permitted to point out that a vast amount of carbon troubles (not graphite troubles) that develop in automobiles result from the very high carbon content of the oil, and in some cases are helped by the carbon content of the gasoline.

AN INTERESTED READER.

Niagara Falls, N. Y.

Referring to the article in question, the word carbon should be substituted for graphite. This carbon fills up the space which otherwise would permit leaks between the sleeves. The latter are not worked closely together, according to the inventor, the real compression being held by the junk ring in the head of the cylinder. The inside of the inner sleeve does not permit of carbon accumulations.

In this connection it may be well to remember that the carbon here produced is unlike that generally referred to as carbon deposits. The latter material is a slaggy crust, while in the Knight motor the carbon, produced in a very fine state, is rubbed into the pores of the metal. If the deposit were of the same nature as the well-known nuisance, it could not benefit the motor, but would detract from its performance; nor would the sleeve surfaces have the brilliancy of steel mirrors, which they have. It may be well to remember that this new type of motor, with its novel points of design, brings up many conditions different from previous practice, and it will take some time yet till the problems resulting from this state of affairs will be satisfactorily solved.

Oil Works Into Cylinder Heads

Editor THE AUTOMOBILE:

[3,042]—I have a 30-horsepower touring car which is lubricated by the constant-level splash plan. The car has been run one season and the pistons and rings are apparently in good condition. The difficulty I find is that too much oil works past the pistons and gets into the cylinder heads and valve

chambers. Can the pistons be grooved out in such a manner that the flow of oil will be turned back? If you will outline a remedy for this in THE AUTOMOBILE I will appreciate it.

J. B. HAGAMAN.

North Branch, Mich.

The pistons can be grooved as shown in Figs. 1 and 2. The pistons are put in a lathe and a groove turned as shown. Several holes are drilled in this groove to form oil ducts. About six holes would be right. The oil would be caught in this groove and allowed to drain back to the crankcase. Another method of curing this trouble is to fit a baffle-plate in the cylinder. A piece of sheet metal is procured and flanged over as is shown in Figs. 5 and 6. Nearly any soft metal, such as zinc or galvanized iron, will fill the purpose very well. This flange is made just wide enough to allow the plate to be fastened in the end of the cylinder as shown in Fig. 3. Screw-holes are tapped in the cylinder in the positions shown. At Fig. 4, it will be noticed that the baffle is cut in order to clear the connecting-rod. This will be found to be necessary. Another point to remember in fitting the baffle is that it should not be too wide, otherwise the piston will not get enough oil. A baffle-plate an inch in width will be found sufficient for most cases of this kind although the best way would be to try one of this width and then determine if the lubrication was satisfactory by withdrawing the piston after the car has been run for about 5 miles. The distribution of the oil can then be noted and the results judged.

Muffler Explosions Explained

Editor THE AUTOMOBILE:

[3,043]—In your question and answer department, issue of February 8, on Acetone as a Decarbonizer, you state that it is beneficial in this respect. I would like to ask if denatured alcohol could be used in place of the acetone? Would the mixture of kerosene and alcohol give as good results?

We have a six-cylinder car and in going down a long hill on compression if the switch is thrown off, there is a loud report or a series of reports or explosions coming from the exhaust. Throwing on the switch stops them at once. What is the cause of this and does it injure the car or engine in any way?

H. E. K.

White Haven, Pa.

Denatured alcohol should be good but we doubt if it would serve the purpose as well as acetone. The mixture in this case should be about 50 per cent. of each.

The reason that you get explosions when using the compression as a brake is evidently because you do not shut off your gas when coasting. A charge is sucked into the cylinder and exhausted. When the inflammable gases get into the heated exhaust pipe where there are very likely to be glowing spots of carbon, an explosion naturally takes place. When coasting, the throttle should be shut off as well as the spark. It is nearly always the case that the carbureter is so adjusted that the throttle can never be completely closed. In this case the explosions are inevitable unless the exhaust line is cleaned out so that there are no carbon points in it. If the exhaust pipe is very hot you will get them even then.

Cleaning Behind Piston Rings

Editor THE AUTOMOBILE:

[3,044]—Will you kindly advise me as to the following:

(1) Is it necessary to clean behind the piston rings even if they show no trouble? I have a new Ford car and take care of it myself. I can clean the cylinder heads and valves without removing the pistons and therefore would like to know if this is necessary.

(2) Is there any bad effect on the engine if it is run about 10 miles with one cylinder missing?

R. H. PANKOW.

New York City.

(1) It should not be necessary to clean behind the piston rings more than once a year. At this time the car should be given a general overhauling either by yourself or a competent mechanic.

(2) There is no bad effect if the motor is run for a short time on three of the cylinders. The balance of the motor is affected and the torque is not as even, but that is all.

Sliding Gears While in Mesh

Editor THE AUTOMOBILE:

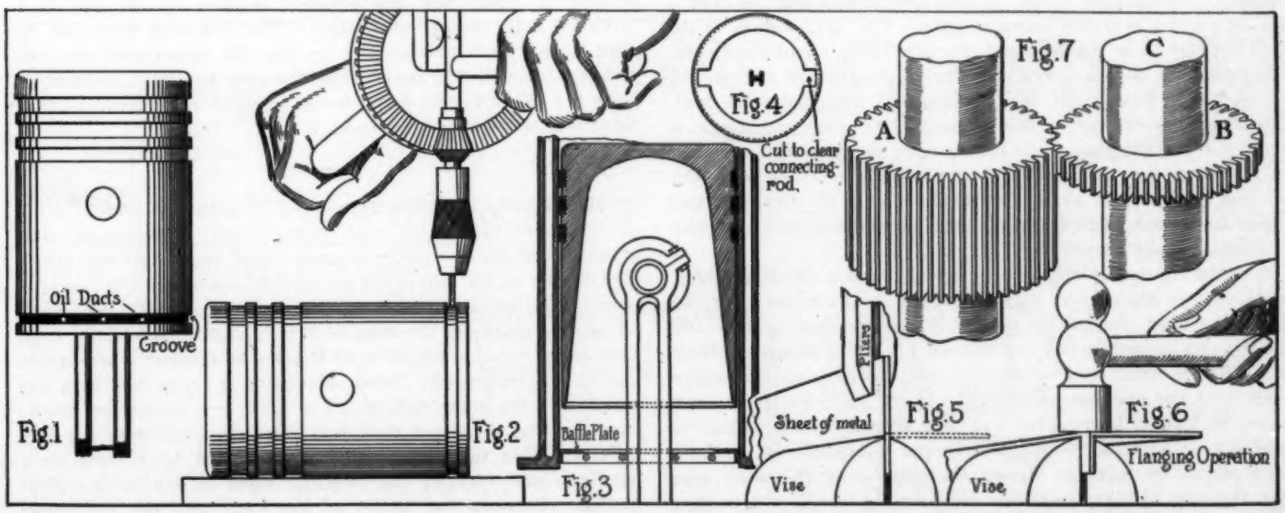
[3,045]—I would appreciate it very much if you would answer through THE AUTOMOBILE the following question:

In the accompanying diagram, Fig. 7, A and B are gears in mesh. Gear A is driven by an electric motor while gear B is driven by gear A. What we want to do is to have shaft C move up and down and still revolve while driving gear B. Is it possible to have gear B run up and down on gear A while they are in motion?

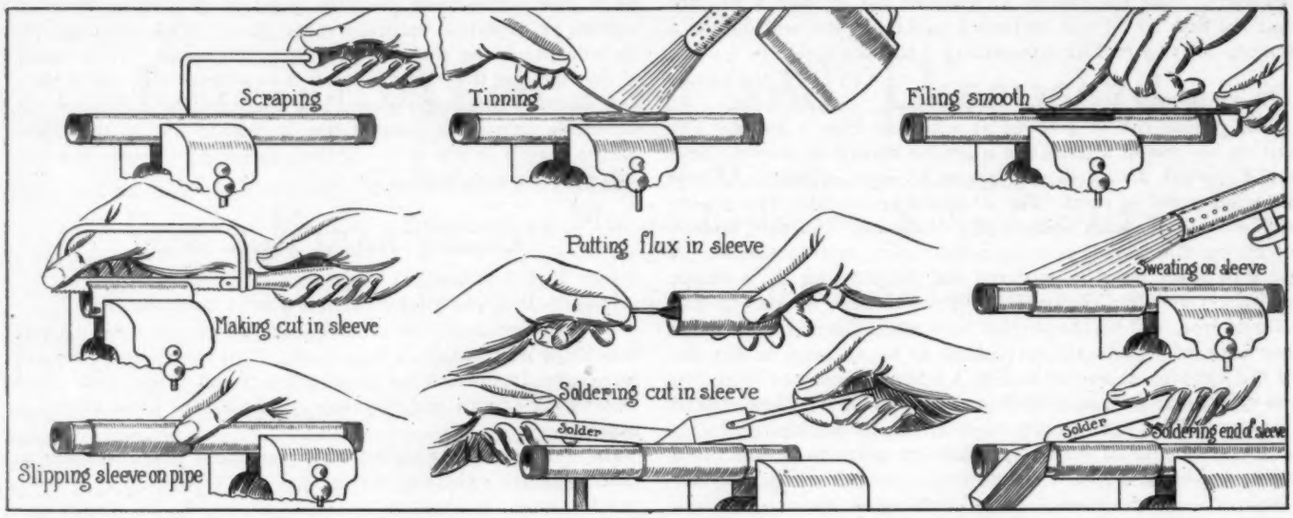
J. D. NICHOLS.

Bernardsville, N. J.

There is no objection whatever in doing this. In fact it is common practice in speed-change devices for mill work, where it is necessary that one shaft revolve at constant speed at all times while the other is moved axially in order to engage with the change-speed members. The principal involved is none other than that of the wedge since the part is driven while the driving member is moving forward.



Figs. 1 to 6—Methods of preventing oil in the cylinder head. Fig. 7—Gears capable of sliding while engaged



Illustrating the various steps comprising the process for repairing a leaky pipe described herewith

Pointers for Repairmen and Drivers

How to Repair Leaky Pipes; Overcoming Spring Noises; When Oil Gets Into the Radiator; Points to Watch in the Gasoline System

REPAIRING A LEAKY PIPE—Hardly anyone who has worked about an automobile or any other piece of mechanism of a like nature for any length of time has not at some time met with a leaky pipe. The pipes which lead to and from the radiator are often subject to leaks and a soldered repair of the ordinary kind will not last as long as it should. When the pipe begins to leak through a fresh spot, or even through a place which has already been soldered, it is better to make a repair which is more apt to be permanent than a mere soldered job. In order to do this work properly it would be better if the operator would remove the troublesome section of pipe if it is at all hard to reach. The scale in the neighborhood of the leak is then thoroughly removed by means of a file and emery cloth. A piece of pipe, which is a size larger than the pipe to be repaired, is then cut in a straight line along its entire length. The cut pipe is then heated and spread open so that it can be slipped over the damaged pipe. The next step is to tin both the pipe to be repaired and the pipe which forms the sleeve. In tinning the pipe a liberal amount of chloride of zinc should be used as a flux, or, if desired, prepared solder may be used. There are several very good forms of this, some coming in a pasty form in tin cans while others come in the form of strips. In the latter type of solder the flux is in the center in a sort of core which runs along the whole length of the strip and which is of such a diameter that the correct proportion of flux to metal is maintained.

A soldering-iron is required to spread the bar or strip solder, while that in paste form may be spread on the metal after the latter has been thoroughly cleaned. Heat is then applied and the pipe to be repaired is first tinned. A slight departure from the methods used is now resorted to according as the solder used is of the paste or solid form. If the paste solder is used, after the pipe to be repaired has been tinned, the sleeve pipe is bent over it with the paste solder spread thinly over its surface. Care should be taken in placing the sleeve over the other pipe that the side of the pipe which has been cut to allow it to pass over the other pipe is turned away from the leak. Heat is then applied along the outside surface of the sleeve and it is thus sweated to the damaged pipe. The parts which are to be tinned must be thoroughly cleaned before they can be tinned. It will be somewhat difficult to do this at times on the interior surface of the sleeve pipe but nevertheless it is an absolute necessity that the time should be spent on this work in order to accomplish it thoroughly as the tinning will not hold otherwise.

In case the bar or strip solder is used, it is evident that the sleeve cannot be tinned before it is bent over the damaged pipe for the reason that the action of bending the metal would loosen the tinning. In this case the best method of procedure would be to thickly tin the pipe to be repaired and then to file this tin clean on the surface and coat the sleeve thickly with flux on its inner surface, which, it must be emphasized, should be thoroughly clean. After this is done the sleeve is quickly slipped around the other pipe and sweated in place by the use of a torch or other means of heating. The sweating must not be done at too high temperature or else the solder will run out and the job will not last. After the pipe has been sweated in place the edges should either be all caulked or soldered so that there will be no chance of leakage.

THE Gravity Gasoline System—The points to watch in the gasoline system are well shown in the accompanying diagram. There are two tanks in many cases, one within the other. The smaller of the two is the emergency tank and it fills two purposes. The more important of the two is to notify the driver when the gasoline in the main tank is exhausted and at the same time to serve as a supply until a place is reached where gasoline can be procured. When ascending a steep hill with the gasoline in the lower tank at a low level, it is sometimes necessary to bring the upper tank into communication with the carbureter. This may be readily accomplished by a turn of a handle which operates the two-way valve shown in the illustration. Between the outlet of the tank and the carbureter there is a filter which is placed so as to catch the water and dirt

from the gasoline. These filters are of different styles, but they all serve a very worthy purpose and they are of great use to the man who cannot always be sure of the gasoline which he is getting. This is especially the case on a tour where it is sometimes necessary to take what can be secured, and that without choice. Another shut-off valve is very often placed between the filter and the carbureter for use instead of that directly at the tank. It is necessary to have one at the tank, however, so that in case a leak develops in a place which is near the outlet it may be possible to stop the flow before the gasoline is lost.

Large vertical bends in the piping, which tend to produce air-locks, must be avoided as the flow of gasoline through the tubing is checked completely in this manner. From the diagram it is easy to perceive the points at which a leak would be most likely to occur, *i. e.*, the joints in the piping and stems of the valves.

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NOISE from the Springs—Dry or rusty springs will emit a very distressing sound whenever a slight obstruction in the road is encountered which causes the springs to deflect more than they would under the stresses caused by a level road. Lubrication between the leaves of springs is not given very much attention. In fact, many makers and expert mechanics will say that it is not necessary. The viewpoint taken by these, however, is not one which should be taken by the owner of a car which is tuned up to run as sweetly as possible, for the sounds caused by a dry or rusty spring are not at all to be desired.

On some springs there is a sort of groove in the leaf which contains a thick lubricant that will hold its body under all conditions. In this case it will be a long time before the owner of the car will be bothered by the necessity of lubricating his springs. In any case the leaves of the spring which fit over each other so tightly will hold the lubricant for a considerable space of time so that it is not a matter of very much trouble to keep them in proper condition. If the car is jacked up in such a manner that all the weight is taken from the springs, the leaves will spread apart and it is then a simple matter to apply the oil. Cylinder oil and kerosene make a good combination for use on this part of the vehicle or graphite may be also used very readily. Either of these two form a very good lubricant for the springs and has a body which is sufficient to last for a long time. In order that the car should run at its best, however, and the noise be reduced to a minimum, it would be well to oil the spring-leaves every 500 miles.

Another point about the springs which may give rise to a rattle is the spring-shackle bolt. When this bolt becomes worn or loose a chattering sound will be heard which often deceives the driver into the belief that the sound emanates from the differential gears. Defective lubrication here is often the cause of the trouble as the wear is greatly augmented when the part is not sufficiently oiled. The bolt should be oiled every day that the car is used, or, if it is provided with a grease-cup this should be given a half-turn. If there are oil-holes on the bolts it would in most cases be better to have them replaced by grease-cups as these are more satisfactory in many ways. To keep the grit out of a bearing the grease-cup is far better than the average oil-hole even though it be covered by some ingenious method. It is a matter of small expense to have the bolt housings tapped in order to fit the cups. It is far easier to give a half-turn to a cup than it is to procure an oil can and then to pour the oil into the oil-hole. Cylinder oil is about as good a lubricant as any for the spring bolt.

Another cause of noise in the springs, and one which does not spring from faulty lubrication, is the looseness of the spring-clips. The shaking of the car as it runs along the road besides the vibration of the motor has a tendency to loosen the bolts which hold the spring-clips in place. These clips are generally of U-shape, each leg of the U being held in place by a bolt which screws on the end. As the bolts become loose the springs commence to chatter on account of the leaves slapping against each other in the clip. It is well to heed a warning such as this for trouble would be very apt to develop should the clip become so loose that the bolts would fall off or that the leaves of the spring would not lie truly one upon the other. Broken spring-leaves should be replaced as soon as they are detected, for the reason that the axle will strike the frame member in case the wheels pass over an obstruction or fall into a hollow place in the road. The spring is designed to deflect a certain distance under varying loads. When one of the leaves is broken, the resistance to deflection is materially decreased and hence the axle will often jar against the side members of the frame. The result of this contact between the two parts will be a loud knock which will be very distinctly heard by the occupants of the car. The knock is not the worst part of the damage, however, as a bent frame or axle is very likely to result.

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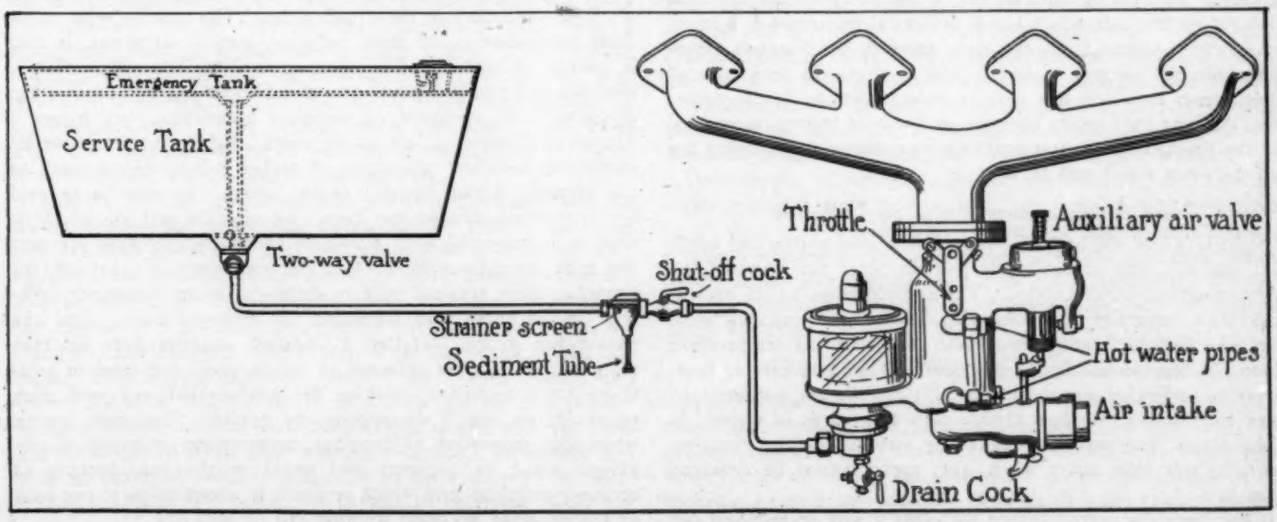
OIL in the Radiator—Oil has a tendency to form a film over metal and to cling there with a tenacity which is greater than is often suspected. When oil gets into the radiator an oil film will often collect on the radiating surface and as a result the water is not cooled properly. The oil film is a very poor conductor of heat and since the water cannot readily wash the film away in spite of the temperature of 180 degrees or thereabouts at which it runs, the contact with the radiator walls is cut off and as a result there will be an overheated radiator. If a couple of handfuls of ordinary washing soda is dissolved in a pail of water and this solution allowed to run through the cooling system for 2 or 3 minutes and the radiator is then flushed out with pure boiling water, the difficulty will disappear.



Indicating the points in a gravity gasoline system at which trouble may occur

Chemical Progress Related to Automobiles

Part II

New Celluloids Fit for Motor Hoods, Windows and Windshields--Silent Gears and Body Panels from Milk and Other Stock Farm Products

WHILE the widespread efforts among the leaders in organic chemistry aimed at the economical production of rubber from new sources are directly traceable to the demands arising from the automobile movement, those which go in the direction of devising substitutes for celluloid, and particularly those substitutes in which the fire risk of ordinary celluloid is eliminated, are explained in the first place through certain defects in artificial silk and have received their strongest impulse from the urgent need felt in the moving picture industry for an uninflammable material for picture films, and it is only incidentally that the products which have been evolved with this main object in view have been found to possess properties which place them directly in line with certain possibilities for new forms of work which are always more or less definitely before the mental vision of automobile builders.

The moment an overwhelming majority of automobiles are produced in series of from 1,000 to 30,000, all alike, and necessarily at the lowest possible cost of production, a plastic material which may be rolled into sheets or molded into shapes by machinery at once recommends itself for body panels and for a number of other parts which at present are made in wood or light metals and often have to be shaped or fitted with a considerable amount of thumb rule work; and when the strength of such a new material is sufficient to admit of light graceful lines, and no objection may be adduced—as in the case of fiber—relating to warping under the influence of weather and exposure or weakening from the use of coloring matter, and when in addition there appears to be a prospect of saving large bills in the paint shop—not only for the manufacturer but also in the course of a vehicle's lifetime for the user—and when in fact the new materials of which the alchemistic sorcerer makes his modern wand promises to keep automobile bodies spic and span when they are old after first helping to make them better, cheaper and more pleasing of outline when new, even the conservative builder, who is justly afraid of nothing so much as of being too far ahead of his contemporaries, may find himself excusable for lending half an ear to the story of the chemical birth throes through which a new industrial material—or a number of them—came from the deep recesses of Nature's storehouse into the turmoil of commercial conflict. In that cycle of great events in which one year is as a minute in human existence, the year 1911 seems likely to go down in history as epochal for the production of new synthetic raw materials bridging the gulf between wood and metal.

New Achievements Based on Cellulose

CELLULOSE, the base of celluloid, fiber, gun cotton and artificial silk, was naturally the starting point for many of the achievements to be chronicled. The shortcomings of its derivatives were naturally the points upon which the attacks were directed. Celluloid jumps into flame at almost any temperature above 110 degrees C., though frequently it endures greater heat. It varies somewhat unaccountably. Fiber, though hardened to serve for locomotive wheel rims, swells and warps in water. It is not plastic and must be worked by strong, drastic pressures. Artificial silk falls apart when wet; spots cannot be removed from it.

It had been discovered before 1911 that a sort of celluloid not readily combustible could be made by using acetic acid instead of nitric. For more than twenty years the efforts to make the cellulose form an acetate and to make the acetated cellulose industrially solvable and thereby adaptable to plastic purposes were prosecuted without real success, and it was again the Farbenfabriken (Fried. Bayer & Co.), where after seven years of costly experiments, the first uninflammable celluloid was produced in commercial quantities.

The forms and the rate of the progress made are indicated in a general way in a supplementary patent to Friedrich Bayer published in January, 1911, being French patent No. 418,309. Here this authority, who is, in fact, also the author of the most economical method so far devised for producing aluminum from bauxite or cryolite, says in substance:

"It is known that solutions of cellulose acetates may be prepared by means of tetrachloride of acetylene, also called tetrachlorethane (Cl_2-CH-CH-Cl_2), and consequently it was expected that other chlorates of ethylen, such as trichlorthylene and dichlorethylene would have a similar solvent power. But such is not the case. The trichlorethylene does not dissolve a cellulose acetate, even if alcohol is added, while the dichlorethylene acquires this property when used with alcohol and heated and is particularly suitable for those acetates which are soluble in chloroform, but only partially soluble in acetone. Those acetates of cellulose which are readily solvable in acetone the dichlorethylene dissolves, with alcohol, without being heated. And its solutions are advantageously used in the manufacture of films and varnishes of the most different kinds as well as of artificial silk."

Examples of its use are given as follows:

"Example 1.—120 parts of acetate of cellulose (obtained according to German patent No. 159,524 of August 2, 1901) are dissolved by heating for several hours with a mixture of 150 parts of alcohol and 730 parts of dichlorethylene.

"Example 2.—200 parts of cellulose acetate (obtained according to French patent No. 371,447 of October 27, 1908) are dissolved in a mixture of 150 parts of alcohol and 650 parts of dichlorethylene; or else in 150 parts of alcohol, 400 parts of dichlorethylene and 250 parts of acetone."

So recent have been the last touches of improvement in the manufacture of celluloid from cellulose acetate that the condition immediately preceding the final conquering of all difficulties is reflected in other patents of 1911.

Troubles in Dissolving the Acetate

IN No. 419,530 to Arthur Eichengrun, published in February, the inventor refers to these difficulties. The trouble with celluloids heretofore made from cellulose acetate, he states, is that it cannot be rolled and molded so well as the nitro-cellulose product, and this is because the acetate does not gelatinize when dissolved with camphor or camphor substitutes, but forms a viscous and more or less sticky paste. Efforts to do better by employing camphor substitutes of higher solvent power, such as the phenols, chloral hydrate or the esters (an ester is an acid lye in which hydrogen has been tied up with carbon) of lactic acid, and dispensing with a volatile solvent while using pressure and heat instead—as specified in German patent No. 141,106, for example—have resulted only in getting a horny substance, lacking the hardness and flexibility of nitro-celluloid. And the reason lies in the fact that a complete solution does not take place in the solvents referred to unless these are used in relatively large quantities—making the product soft—or with high temperatures, which decompose the acetate. In other words, when that proportion of camphor, or camphor substitute, is employed which is required and usual in the manufacture of ordinary celluloid, and which amounts to about 20 to 30 per cent. of the cellulose, no good solution can be obtained.

But Eichengrun has discovered how this trouble may be remedied. He causes a uniform and comminuted distribution in the cellulose acetate of the helpful ingredients by first dissolving the latter in suitable quantities of liquids not heretofore employed, used in this line of manufacture. He uses either a volatile liquid which does not dissolve the acetate or a mixture of one which does and one which does not. Alcohol, or a mixture of alcohol with a little acetone or crystallized acetic acid, is the distributing agent which he prefers for carrying the camphor to all cells of the cellulose. This then absorbs the liquid completely, and, by kneading or subjecting the whole mass to a moderate pressure and then heating it and evaporating the alcohol, a transparent and uniform substance is obtained which has all the plastic qualities and—when once completely dried—all the hardness and elasticity of nitro-celluloid, while sharing with other acetic celluloids the safety against fire risks.

It is a different plastic material which Jan G. Jurgens and Herman Timpe have in view in their patent, No. 420,164. While cellulose is not soluble in alkaline albuminates—in contrast to glycerine, the sugars, starch and other substances which include one or more alcoholic groups of molecules, all of which form characteristic compounds with the alkaline albuminates—the hydrate of cellulose is, and the inventors take advantage of this fact. They have found that a mixture, in certain accurate proportions, of cellulose hydrate and an alkaline albuminate combines into a single substance even at ordinary temperatures and, if heated, rapidly forms a compact mass, which, when dried and compressed, acquires considerable hardness without the brittleness of the ordinary proteins (the inventors here referring to a defect in some of the plastic materials made on a gelatine or casein base). This substance is workable and a non-conductor of electric current. It may be used as a substitute for ebonite (a black, hard rubber product used for slides and shutters in cameras, for example), horn and ivory.

Uninflammable Celluloids Sought for

MOST of the experimenters and scientists seem to think that cellulose acetate has been demonstrated to possess properties which, with increasing experience in its utilization, must eventually render the celluloids derived from it superior in all respects to the nitro-celluloids as yet more commonly used, and that it must also come to play a great part in the composition of other plastic materials to be used for structural purposes. Efforts to render the ordinary celluloid uninflammable by surrounding its cells with ignifugeous substances have therefore largely been abandoned, so much more as it seemed hopeless to undertake to protect in this manner a substance containing within itself both the fuel and the flame-propagation elements. At least one such effort is recorded in 1911, however. As reported in a recent issue of THE AUTOMOBILE, Joseph Nigro and Paul Hollande describe in patent No. 420,312 an apparently simple, though perhaps not inexpensive, method for rendering uninflammable the ordinary celluloid and all other similar compounds made from a pyroxyline (cellulose nitrate or gun cotton) base. They dissolve 1 weight part of celluloid in 10 weight parts of acetone, and, separately, 1 weight part of chlorinated magnesium powder in 3 parts of alcohol. The two solutions are mixed, and when dried the compound is in all respects a counterpart of transparent celluloid, except that it does not burn.

Probably all the acetyl celluloid made in Germany and the United States—the production having spread rapidly after the first practical success of the Farbenfabriken—is made by first subjecting the cellulose to the action of acetic anhydride (which is acetic acid minus the hydrogen atom), with the use of acetic acid and some other acid for diluting purposes to assist in the absorption and uniform distribution of the anhydride in the cellulose. This is also the way followed by Walter Parkin and Alfred Williams. They explain it in their patent, No. 420,010. If ordinary cellulose, 100 parts, they say, is mixed with 450 parts of glacial (pure) acetic acid, 280 parts of acetic anhydride and 10 to 15 parts of sulfuric acid, this mixture transforms itself in 12 to 14 hours into anhydrous acetate of cellulose. This has long been known, they admit. But it is necessary to render this substance soluble in chloroform and acetone. This they do by adding to it, *while it is yet in solution* (and this is their principal innovation), 25 parts of nitric acid diluted in 75 parts of water. Now, if the mixture is left 12 to 14 hours, a precipitate can be formed by adding water, and this precipitate, well washed and dried, can be dissolved in acetone, chloroform or glacial acetic acid, whereafter, by evaporation of the solvent, the celluloid material is obtained.

As camphor was originally used for dissolving the nitro-cellulose and getting a really plastic mass from it, so the camphor substitutes are now used for the same purpose, especially with acetyl-cellulose. Their number is great, and includes phenol and chloral hydrate. But the new cellulose is also soluble in other substances, such as the acetone, chloroform and acetic acid mentioned in the Parkin and Williams patent and in tetra-chloretane ($C_2H_2Cl_4$), the latter being in wide use, comparatively speaking, as it has many advantages, being cheap, uninflammable and not very volatile.

Possibilities for Automobile Builders

OTHER methods for producing uninflammable celluloids have also gained much headway. As soon as formic acid was produced synthetically and cheaply, and it was discovered that such formic acid acted directly upon the cellulose if some sulfuric acid or chloride of zinc was added, efforts for making both celluloids and silks from formic cellulose became numerous, and these hold out great promise, especially with regard to low cost of production and greater facilities for introducing coloring matter, some colors being soluble in formic acid, so that they will enter the product without weakening its mechanical structure.

Patent No. 420,356 to the L'Oyonnithe Company signalizes at the same time an effort for cheapening the original uninflammable celluloids made from cellulose acetate by pointing a way to gain the acetic anhydride from calcium carbide.

According to the best sources of information, the manufacture of uninflammable celluloid is now an accomplished industrial fact and large quantities of small articles made from it are already in the market. Legislation compelling its use—or rather prohibiting cellulose nitrate—for cinematograph film rolls may be expected at any time, and the application of the product in many new directions where the constantly improving properties of the virtually new substance would be appreciated awaits probably only a more widespread knowledge of the facts.

That all windows in automobile bodies and tops should by all means be made from an incombustible celluloid, if from celluloid at all, goes almost without saying. With the fire risk removed, the celluloid window for carriage bodies promises a lighter body construction than could be contemplated so long as glass panes are considered indispensable; and it is at least a constructor's chance that the art of building convertible types of automobiles, readily changed from open to closed and perhaps with the cover portion well adapted to be folded away somewhere in the vehicle itself, may be revolutionized through the new opportunity which advancing chemistry is offering. And, besides, the celluloid window panes, be the body panels as rigid as they are now or much lighter, have the advantage of clouding less with rain from the outside or precipitated moisture from within.

Used, in the transparent varieties, for motor hoods, uninflammable celluloid might be found to have a spectacular and decorative value. It would neither burn nor buckle, and probably it would not melt. It would show scratches less than painted sheet metal. But several years may elapse before the celluloid manufacturers can contemplate entering upon such an enlarged scope for their activities.

Other New Materials More Important

It seems possible, from the practical automobile builder's viewpoint, that certain new structural materials which have been evolved concurrently with the new celluloids may enter more largely than these into the automobile construction work of the immediate future by reason of their much lower cost of produc-

tion and the greater rigidity which it is practicable to impart to them if this property is considered desirable. The progress which has now been made in the manufacture of these materials is mostly due to the search for an uninflammable cellulose, for artificial silk as much as for picture films, the uncertainty of the final outcome forcing the experimenters to look in more than one direction for results. In most instances it may be noted, for example, that the materials have been intended originally to be used as substitutes for celluloid and that provisions were made for producing them in transparent as well as in opaque grades. The products of the dairy farm and of the packing-house went largely into these materials. By treatment of gelatine with formic acid substances were formed whose principal fault lay in the fact that they absorbed moisture as readily as cellulose itself. Others made from casein with various admixtures of resin, lac, glue and glycerine, including those known as "gallalith," "cornalith" and "viscoid," were hard and impervious enough but lacking in flexibility. But in these respects great progress has lately been made, although most of the progress is perhaps still in hiding.

Casein is the base which promises most for structural purposes, partly because it is cheap and abundant and partly because familiarity with its properties is being gained from its extensive use in the textile industry, where it goes largely into the finish of cottons and linens, for example. In fact, the industrial uses of casein are expanding with great rapidity. Countries which have been turning the milk of their dairies into butter and cheese, frequently wasting the whey because it was impracticable to feed it to hogs as on the individual farms, are now turning the skim milk into industrial casein; with lactose—also known as sugar of milk—as an equally valuable by-product from the whey. The centrifugal cream separator which takes the last globule of cream out of the cow's lymph and the co-operative dairies have made this move possible and unavoidable. Ordinary cow's milk contains about 3.33 per cent. of butter, 3.43 per cent. of casein and 5.44 per cent. of lactose, the rest being water, and it may be noted as a matter of curiosity that the milk of an ass, according to Dryers' contains 6.40 per cent. of lactose, only 0.60 per cent. of casein and 1.50 per cent. of butter, while the milk of carnivorous animals contains scarcely any of the sugar.

Casein, Silica and Glycerine United

APPARENTLY the most important of last year's published discoveries bearing upon the use of casein for structural material, was the process of Leon Labbé, of which a detailed account was given in THE AUTOMOBILE of December 28. By his method, gelatine or lac may be combined with jellied silica so as to form a hard and transparent substitute for celluloid, or casein may be combined with the jellied silica with or without the addition of other substances, and the result in the latter case is a structural substance which may be rolled, pressed or molded into all desired shapes. By varying the proportions of glycerine in the jellied silica, the hardness of the preparation is varied proportionally. It is susceptible of receiving coloring matter, and seems, in many respects—especially the preparation and use of jellied glycerine-silica—to represent a new departure in a new art.

Some of the properties of casein are indicated in a few of the best-known facts relating to its chemical combinations. It is insoluble in water but soluble in the alkalis and in weak acids. Combined with chalk it produces a compound which does not change under any atmospheric conditions, which explains its use in paints where it has largely taken the place of albumin. Dissolved in water saturated with borax, it becomes strongly adhesive and may be used advantageously as a moisture-proof glue. Mixed with calcined magnesium and oxide of zinc it affords a very hard, white substance which may be carved and polished like meerschaum, while much stronger.

The tensile strength of nitro-celluloid is given as 7.5 kilograms per square millimeter (equaling about 6,020 pounds per square inch) with an elongation of 28 per cent., while that of acetyl-celluloid of good quality, but not made by a process including the latest improvements, reaches 7 kilograms with an elongation of 40 per cent. The casein products are understood to be stronger, but data are naturally still unreliable.

A very close relation seems to exist between the artificial silks produced from other than a gun cotton base and the compounds adapted for structural material. The methods which lead to a strong and flexible silk seem to lead to the best and strongest structural materials as well, but a method which is relatively economical for silk production may, of course, be absolutely prohibitive in cost for the grosser purposes. Still it is by way of devising new methods for improving the quality of the silks derived from cellulose acetate, cupramoniacal cellulose, formic ether of cellulose, casein, gelatine or combinations of these bases that materials are being evolved which promise to compete with wood, aluminum, duraluminium and steel; cost of production, mechanical properties and suitability for modern manufacturing methods all duly considered.

Some of the inventions of the year show this interdependence in the chemical developments by which the world is likely to get at about the same time "waterproof" artificial silks at relatively low prices and toughened structural materials on a casein base, although the latter, until very recently, was considered unavailable, because the plastic materials produced from it lost the greater part of their elasticity when hardened, becoming brittle in proportion to their hardness; much as in the case of steel before the chromium alloys changed this condition.

Wladimir Plinatus, of Berlin, claims in patent No. 424,228 the use of chemically decomposed glycerine and its residues as a means for obviating brittleness in elastic materials produced from gelatine, lac and other albuminoids.

Valuable Clue from the Silk Industry

THE Vereinigte Glanzstoff-Fabriken, which is the principal representative of the Schweizer method for producing artificial silk by using a solution of cupric oxide in ammonia as a solvent for cellulose nitrate and coagulating the threads with dilute sulfuric acid, had in the early part of the year filed a record of its discovery to the effect that the cheap and abundant wastes from the Glanzstoff method for producing artificial silks, and also from the "Viscose" method (in which xanthate of cellulose is used), may be used very advantageously in the production of uninflammable celluloids and plastic materials from cellulose treated with formic acid.

During the previous year, May 18, 1910, the same concern had applied for German patent for the discovery that lactic acid (derived from milk) dissolves the formic ethers of cellulose and thus may be used for transforming such formic ethers, or their solutions in formic acid, into silk or plastic materials, and this discovery—which seems in reality to antedate the one relating to the use of the silk wastes—is also claimed in French patent No. 428,069, published in August, 1911.

Finally there appeared in December in *Chimie Industrielle* a transcription of patent No. 431,052 to the Dutch Silk Mills Company, in which it is stated that the silks so far made from casein have been coarse and brittle and that, when this fault was remedied in part by the admixture of glycerine or similar substances it lost in strength. But now it has been discovered how such a product from the chemical principle of cheese can be made exactly like natural silk. When the casein is decomposed by means of pyrophosphates, a portion of it is precipitated, and the portion which remains in solution is alone used for the silk production. This portion is, by the way, very similar to casein derived from human milk. Silk can also be made from the other portion, but it is of poor quality.

No doubt others will go farther along this road and succeed in freeing the casein, by some economical method, from the minute ingredients which mean a diminished strength and toughness in the plastic structural materials which may be made from it. The results accomplished with steel by cleansing it of oxides and nitrogen by the use of scavenging elements such as silicon, manganese, titanium, and vanadium, or by the superlative heat of the electric furnace, offer a parallel.

The Ideal Automobile for 1913

Some of Our Readers' Conceptions of What Next Year's Car Should Be

Metal Body with Wood Wheels

EDITOR THE AUTOMOBILE:

In my selection of an ideal car, I would specify a frame of heavy pressed steel construction with a 4-inch drop. The body would be of the four-passenger, torpedo type, with a heavy cowl over the dash. I would prefer a metal body, painted a battleship gray.

I would use front springs of the heavy, semi-elliptic kind, while, in the rear, I would use the three-quarter elliptic, with scroll ends and heavy hangers. The construction of the front axle would be of nickel steel and of heavy I-beam section. Nickel steel construction would be used throughout on the integral forged yokes and spring seats, and also in the forged tie rod ends and steering knuckles. The rear axle should be of the floating type, with the plate bolted to the face.

I place full confidence in wood wheels, of the artillery type, with convenient Baker demountable rims. Large wheels would make riding comfortable, therefore 37 by 5 would be the preferable size fitted with either Goodyear or Diamond non-skid. The wheelbase would be 120 inches, while the tread would measure 56 inches.

I pin my faith on the four-cylinder engine, the cylinders cast in pairs. The four-cycle type would be used in preference to the two, owing to the trouble experienced by most two-cycle users, that this type of engine is still in the infancy of its development. A motor of 5-inch bore and 5 1-2-inch stroke, motor and transmission, of the unit construction type, with a three-point suspension, would be used.

The cooling would be well cared for by a centrifugal water pump, fan, and a honey-comb radiator. I would use the Bosch dual system for my ignition. A Stromburg model F carbureter would be fitted.

A self-contained splash system, the level maintained by a power-driven plunger pump, would be used in the lubrication with a sight-feed on the dash. I would also specify a cone clutch, leather faced, incased in a housing with the flywheel.

Nickel-steel gears should be used in the transmission, which should be selective, with three speeds forward and reverse. The drive should be direct to bevel gears in differential.

Brakes of the internal expanding and the external contracting kind should be used on the rear wheels. The steering gear should be of the inserted spider semi-irreversible split nut and worm type, with a 20-inch wheel. The control should consist of a friction release, accelerator, muffler cutout, with the spark and throttle on top of the steering wheel, which should be placed on the left with the control levers in the center.

I think the beauty of the car lies in the finish. Nothing adds more to this than to see a car finished with nickel trimming throughout; electric lighting, with the Gray & Davis equipment, adds to the convenience, while if the other equipment, such as a top of a high grade shield-silk mohair and the seats covered with the best seat covers, is used, it will add greatly to the appearance, the last, but not least, important point in mapping out an ideal car.

Such a car as this should cost about $2,000. I consider this to be the price which should be paid for a car of this caliber as the materials which enter into the best construction are more expensive than those which it would be possible to use in a car which was sold at a price smaller than this amount.

Houston, Texas. J. CLARENCE THOMAS.

The Tools Must Be Accessible

Editor THE AUTOMOBILE:

I have read THE AUTOMOBILE regularly for years and for some months have been greatly interested in the cars which have been described by readers as their ideals. Nearly everyone has an idea of what sort of a car he prefers. The following are the specifications which I would incorporate in a car if I should build one. It should be a five-passenger car, to cost between $1,500 and $2,000. The wheelbase ought to be 120 inches, with three-quarter elliptic springs and should be equipped with shock-absorbers. The rear tires should be 36 by 4 1-2 inches, and the front tires 36 by 4 inches. There should be demountable rim tires. The gearshifts and emergency brakes should be center-controlled. There should be three speeds forward and reverse, leather-faced cone clutch. Timken roller bearing axles front and rear, rear axle of the floating type, suitable fixtures for licenses on front and rear and a self-starting device.

My ideal car should be equipped with speedometer and windshield. There should be a suitable place, either under the floor or directly back of the front seat, for a spare tire; tools should be carried under the rear seat, accessible by means of a drop door fastened by a good lock on the rear of car. There should be a foredoor body, both foredoors removable, and the car should have a right-hand drive. There should be an 18-inch corrugated steering wheel with control of spark and gas on top. There should be foot rail and robe rail, gasoline gauge, motor, 3 3-4 inch bore by 5-inch stroke; four cylinders, force-feed lubrication, ample cooling system. The car should be electrically lighted, should have an electric bulb horn, all working parts to have provision for taking up wear, all should be easily accessible, gasoline tanks of not less than 20 gallons capacity, two separate ignition systems, metal body, brake drums not less than 10 inches in diameter, 2 inches wide, containing brakes of the internal expanding and external contracting type.

In the equipment there should be one extra rim. I would include in the specifications an automatic pump for pumping up the tires. To give the ideal car a symmetrical appearance the running board should be free from tool boxes, tires, tire-holders and the like.

There is no car made in the world that will comply with these specifications, and according to my way of thinking, when such a car is built it will be the ideal car.

Jefferson City, Mo. J. E. ELBRIDGE.

Likes a Little Car for Two

Editor THE AUTOMOBILE:

I have followed with great interest the descriptions given by your readers of the ideal car. I would very much like to offer my opinion from a little different standpoint than that generally taken by your other contributors who go more into mechanical details than I think is necessary. The motor car industry has now reached that advanced stage where a man gets what he pays for. Motors vary but little for a given horsepower and the styles of body upon the market at the present time seem to be the last word in comfort. I would therefore state that the ideal lies in selecting one of the cars now upon the market. And, by all means, I would say that where there are but two in the family, a little runabout would be ideal.

Reading, Pa. G. J. JACKSON.

Automobile Metallurgy Made Easy

By E. F. LAKE

XV—Medium and High Carbon Steels

In Steels for Automobile Use Both Ductility and Hardness Are Required

THE different grades of the ordinary steels are almost entirely determined by the quantity and condition of the carbon in the metal, as this element affects their mechanical properties to a much greater degree than any of the other elements, or all of them put together. To a large extent, the carbon content also governs the process by which the steel is made. The Bessemer process is used for manufacturing a large part of the low-carbon steels, while the medium-carbon steels are nearly all made in the open-hearth furnace. The tool or high-carbon steels of the better grades are usually made by the crucible process, although the electric furnace is fast coming into use, and probably will eventually replace the crucible process. Cheaper grades of tool steel, however, are made in open-hearth furnaces, but when so made, greater care is used in their manufacture and the impurities are kept lower than in the medium-carbon steels. Likewise, some of the better grades of the low-carbon steel are made in open-hearth furnaces and these are nearly always selected for such automobile parts as can be made from low-carbon steels.

Any increase from 0.30 per cent. of carbon to the higher percentages that are used in steel does not cause any distinct phenomena to take place that will aid in making a division between the medium and high-carbon steels. Consequently, the division line varies, but usually steels containing from 0.30 to 0.60 per cent. are called medium-carbon steels, while those containing over 0.80 per cent. are called high-carbon, hard or tool steels. Some, however, might make this division anywhere between 0.50 per cent. and 0.70 per cent.

In steel making, the carbon is said to enter into solution with the iron. This means that two elements have combined so completely and in such a manner that no method is known whereby it is possible to distinguish the one from the other. To find out how much carbon is present in steel, it must be separated from the iron by certain powerful chemical reactions. When this is done, the carbon is weighed and its percentage is figured from the total weight of the entire mass. When the carbon percentage in steel goes above 0.90 per cent., however, this combination is not complete, as then the iron will not dissolve all of the carbon and particles of it will begin to separate out in the form of graphite. The more the carbon percentage is raised above 0.90 per cent., the greater will be the amount of graphite that is present in the steel.

A crude example that may be used as a comparison of this phenomenon is that of salt and water. If we take a glass of fresh water and put a little salt into it, it dissolves in the water, i. e., the two form a combination by entering into solution. In this state neither the salt nor the water can be distinguished from each other, but both elements are present and can be separated from one another, by either boiling away the water or by freezing and thawing the mass a number of times. Arctic explorers use this latter method to make drinking water out of the sea water. If we keep adding salt, its percentage will reach a point (represented by the 0.90 per cent. of carbon in steel) at which the water cannot dissolve all of the salt and small particles can be seen floating through the mass. Being a liquid, the excess salt will in time form a ring around the edge of the glass or settle to the bottom. If the water were frozen the particles would remain in the mass, the same as graphitic carbon does in steel when more has been added than will enter into solution with the iron.

These particles of graphite weaken the steel, and hence after a carbon content of 0.90 per cent. has been exceeded, the strength of the metal begins to decrease until at about 2.00 per cent. of carbon it reaches the form of cast iron. Each increase in the carbon percentage from 0 up to 0.90 per cent. will result in a gradual and rather rapid increase in the tenacity of the metal. From there to about 1.25 per cent. of carbon a slight increase occurs, but beyond this latter point the tenacity rapidly decreases. Each increase in the percentage of carbon causes a gradual increase in the hardness of the metal, and a decrease in the ductility that follows an irregular curve. This curve shows a rapid decrease in ductility when the carbon content is raised from 0.50 to 0.70 per cent., but at the other points the decrease takes place more slowly.

It is, therefore, necessary to use a great deal of judgment in selecting the proper carbon steel to perform any certain part of the work that automobile parts have to perform. Some require a high ductility, and this can only be obtained by a sacrifice of hardness, while others require a great hardness, which can only be obtained by the sacrifice of ductility. It is always necessary to effect a compromise between these two properties and choose the carbon content in steel that will give the greatest hardness that can be secured with the required amount of ductility.

When the carbon content has been raised above 0.25 per cent. the metal is too difficult to form into the desired shapes by cold drawing or cold rolling, and hence its strength cannot be increased in that manner. Such metal, however, is much more susceptible to heat-treatment than the lower carbon steels and its strength can be greatly increased by a correct hardening and tempering. Each increase of 0.01 per cent. of carbon increases the tensile strength of pure iron from 750 to 1,150 pounds per square inch, the variation being caused by the process by which it is manufactured into steel and the method employed to determine the amount of carbon by chemical analysis.

In hardening high-carbon steels the hardness will penetrate to the center of a fairly thick piece to a much greater degree than in low-carbon steels, and hence more uniform results can be obtained throughout the mass of the metal. The increase in strength that is given steel by the carbon content and also the additional strength that may be given it by proper heat-treatment are shown in Table I.

Steels containing over 1.00 per cent. of carbon have but few uses, and even with that percentage it is not used for automobile construction, except for the balls for ball bearings. These are usually made from steel containing 1 per cent. of carbon and 1 per cent. of chromium.

While the better grades of leaf springs are always made from the alloyed steels, some fairly good results have been obtained with carbon steels, and when this is used steels containing anywhere from 0.80 to 1.00 per cent. of carbon are generally chosen. Steels with the higher carbon content will have the finest grain and springs made from it will last longer if they are given the proper heat-treatment. The heat-treatment, however, must be very exact or the springs will break easily, as the higher the carbon content the harder the steel can be made by heat-treatment

RAISE IN STRENGTHS CAUSED BY CARBON CONTENT AND HEAT-TREATMENT

CHEMICAL COMPOSITION					MECHANICAL PROPERTIES							
					Annealed				Hardened			
Percentage of					Pounds per Square Inch of				Pounds per Square Inch of			
Carbon	Manganese	Silicon	Phosphorus	Sulphur	Tensile Strength	Elastic Limit	% of Elongation	% of Contraction	Tensile Strength	Elastic Limit	% of Elongation	% of Contraction
0.41	0.63	0.22	0.04	0.04	89,100	48,300	25	43	115,700	77,100	12	31
0.52	0.35	0.18	0.02	0.04	97,800	52,600	20	35	132,100	81,400	9	..
0.60	0.40	0.12	0.04	0.03	116,400	66,500	14	47	153,400	102,100	8	28
0.71	0.38	0.17	0.03	0.03	130,700	75,800	9	37	180,100	105,500	6	18
0.80	0.35	0.20	0.03	0.03	141,300	84,100	7	26	184,200	142,200	7	22

and hence the more brittle it becomes. Some spring makers, therefore, prefer to use the spring steel with the lower carbon content as the fitter, or man who shapes the spring, hardens and tempers it when it is being fitted and very accurate temperatures cannot be maintained. When properly heat-treated, such springs can be given an elastic limit that is between 150,000 and 200,000 pounds per square inch, and when so treated they will last a long time without breaking.

In some instances connecting-rods, crankshafts, driving-shafts, etc., have been made from steels that contain from 0.60 to 0.80 per cent. of carbon, but this is not generally considered good practice, as such metal does not have a degree of toughness to properly withstand the strains put upon them.

The medium-carbon steels, i. e., those ranging from 0.30 to 0.60 per cent. of carbon, give the best results for such parts as gears, crankshafts, connecting-rods and propeller or driving-shafts. With such steels it is possible to obtain the highest degree of hardness that can be given carbon steels without sacrificing the needed amount of toughness. Sometimes, however, such parts are made of low-carbon steel that is carbonized or case-hardened enough to give the outer shell a high-carbon content and hence the proper hardness. This is especially so of transmission gears, as better results can be obtained in that way if the carbonizing, and afterwards the heat-treatment, has been properly done.

Increasing Power of Acetylene Lights

A METHOD for considerably augmenting the capacity of acetylene lights has been described by A. R. Myhill in a recent issue of *The Motor Cycle*. It consists in mixing a small amount of oxygen with the acetylene, before the gas flows to the burner. This is done by dissolving a little peroxide of hydrogen, H_2O_2, in the water used for generating acetylene from calcium carbide. By using a solution containing about 6 per cent. hydroxide by weight a solution is obtained which cannot injure the walls of the generator by its acidity. The action of the oxygen is illustrated by the following tests made by the inventor:

Ounces of hydroxide per pint of water	Increase of candlepower
½	50.
1	62.5
2	68.8
3	71.

In experimenting with this substance care should be taken in mixing larger quantities of hydrogen peroxide with the generator water as the enriched acetylene is very inflammable.

Another line of experiments, which, however, should not be undertaken except under the supervision of a skilled chemist, is the admixture of peroxide of gasoline. Tests made at one time or another with gasoline enriched by picric acid and other substances containing oxygen have been satisfactory enough to invite further research, and as hydrogen peroxide, under certain conditions, produces ozone, a suitable content of this compound in gasoline might prove of advantage, especially in cold weather.

Harking Back a Decade

Extracts from the Automobile Papers of Ten Years Ago

FROM *The Motor Review*, February 27, 1902:

In our last issue we regret to state that the item concerning R. L. Morgan securing the American rights to the Thornycroft patents was in error. The patents in question are controlled by Thorpe, Platt & Company, of New York.

The Automobile Club of Illinois has been organized at Chicago. The club expects to recruit its members from local golf clubs and will be strictly for amateur automobilists.

The F. B. Stearns Company, of Cleveland, has been incorporated to manufacture gasoline automobiles. The company succeeds F. B. Stearns & Company and will continue its one-cylinder car and in the near future will put out a tonneau.

Great difficulty is being experienced in the Chicago field in making deliveries so far this season. Almost every dealer on the row has orders ahead, but they cannot get the cars promptly to fill them.

The two heavy snowstorms experienced last week have effectively put a check on automobiling in and about Springfield, Mass. The 9 inches of snow is too much for the cars.

W. J. Budlong has been elected treasurer of the Electric Vehicle Company. He was formerly manager of the Pope branch in Chicago and recently has been in charge of the Riker works at Elizabethtown, N. J.

The Munger Automobile Tire Company, recently incorporated at Trenton, is equipping its plant as rapidly as possible.

The Toledo steamer now on the road from Toledo to Hot Springs, Ark., has reached Little Rock. There were no roads and no bottom this side of Memphis, and the car had to be shipped by rail across the Mississippi lowlands.

While trying to turn his car on the incline at the Indianapolis Cyclorama, Sidney W. Elston fell 22 feet with his car and suffered several fractured bones. A passenger was also severely injured. The car fell into another exhibit, smashing one of the models to bits.

The campaign being made by *The Motor Review* to differentiate legitimate trade and stock selling schemes has met with much approval in the industry. Dozens of reputable concerns have written in supporting and applauding the position assumed by the paper.

Two delegates from each of the prominent automobile clubs of the country have been invited to attend the great meeting at Chicago, where it is expected that some sort of a national organization of automobilists will be formed. There are about fifty clubs in existence now, distributed through thirteen states.

New models of the Rambler, Packard, Stearns and Electric Vehicles have made their appearance. The Packard is a tonneau with a single-cylinder motor with spring drive and automatic firing control.

Senator William A. Clark, of Montana, owner of the biggest and busiest automobile in Washington, has made application to join the National Capital Automobile Club.

The Cocks bill has passed the legislature, being adopted in the Senate by a vote of forty-eight to nothing. The bill went through under a misapprehension as the clerk called it up merely under its title as an amendment to the Penal Code. Before the big lobby from New York could intervene any objection, the roll had been called and the falling gavel of the Lieutenant-Governor rendered their efforts futile. After the damage had been done a motion to reconsider brought matters to a standstill.

E. W. Roberts, editor of *The Gas Engine*, has resigned that position to become mechanical chief of the Elmore Manufacturing Company, at Clyde, O.

Review of Electric Situation in Europe

The Gasoline Car Has Been So Far in Advance as to Practically Eclipse It During the Past Decade

"WHEN the storage battery of your electric vehicle is exhausted all you have to do is to put a handful of this powerful chemical into the battery and wait half an hour; it will then be ready to take you a hundred miles again." If this were true, gasoline automobiles might be as scarce in Europe as electric vehicles are now. The electric vehicle has practically been in eclipse there for the past eight years, or ever since the gasoline automobile attained such a degree of reliability that even the most skeptical could no longer doubt its future. The storage battery then went out of the popular prints and retired to a scientific and corporate existence.

There was little in its nature to attract the improving activities of that legion of enthusiastic dilettante inventors who in their aggregate have done so much to keep the internal-combustion motor in the limelight and to gather capital to further its development.

And the other, the mechanical elements of the electric vehicle, the motor particularly, had at an early date, in Europe as here, gotten into the hands of large corporations, partly by reason of the enormous field which had been opened for dynamos and motors outside of the automobile line and partly because the successful manufacture of these electric appliances calls for extensive and well-organized facilities, while real improvements in their design are based on a scientific understanding of the electric laws, which is not the forte of those optimistic minds who push ordinary mechanical improvements along to a successful ultimate consummation, spite of blundering and waste and often in defiance of those seemingly well-established precedents which stay the conceptions of the trained and conservative engineer.

The blight of too much scholastic engineering knowledge had much to do with holding the electric vehicle back in Europe, where one graduated engineer with settled convictions—often too fixedly settled and too mathematically founded—commands more capital than ten hopeful mechanics. Even now Europe is slow to learn how much genuine ability climbs slowly up from below-stairs by its own effort and persistency.

Without the abiding example of continued fidelity to electric road vehicles in the United States, adverse professional theory would probably even at this date have prevented the revival of railless electric transportation which is now being observed in Europe and which is formulating itself, quite rationally, along two distinct lines, namely, the adoption of storage-battery vehicles for public work and a renewed willingness to try the electric transmission of power derived from a gasoline motor for the work of private corporations.

Pleasure Electrics Little Used

THE very limited use of electric vehicles for individual purposes, which still continues to be the rule, finds an explanation, in addition to that mentioned, in some of the other facts in the situation. First of all, perhaps, there was not in Europe at the time when the automobile movement had its beginning (and there is not yet, outside of Germany at least) such a widespread partial familiarity with electric work as obtained in this country. The general confidence in the wonders of electricity here gave the storage-battery vehicle a long start at a time when the gasoline motor was still very unreliable, and the troubles experienced with early storage batteries, when they were shaken up in a road vehicle, were very fully recognized before any movement in their favor could gain momentum there. On the other hand, the gasoline motor, as made in France and by a few firms in Germany, England and Italy, was at least 3 years ahead of those made in the United States in point of reliability. This country gathered the data for teaching Europe a partially negative and warning lesson with regard to electric and steam vehicles for individual use during the same years when Europe established the design of successful gasoline cars. The fact that the work done here with electric vehicles after all was not all lost, but resulted in a close definition of their special field and in an immense improvement of the batteries, just as in England a useful field was gained for steam in heavy traction, could not change the general result, which in Europe was the concentration of all popular energies upon the production of gasoline vehicles and the bankruptcy of practically all concerns which ran counter to this current. In France, where the automobile fashion was set at that time, whatever sympathy could be spared from the gasoline car went to Serpollet's flash-boiler steam car—and died with him—and neither the Mors nor the Kriéger electric vehicles would take root. There was no independent social status for woman to help out the demand for electric victorias, phaetons or runabouts. The feminine social whirl, with its shopping, visiting and conferences, was not established there or anywhere in Europe on a business basis, as in the most provincial city of the United States. And there was no huge aggregation of business interests identified with the protection and development of storage batteries and determined at all hazards to advance their cause.

German Experience Parallels Ours

THE ups and downs through which the electric road vehicle industry has passed in this country in comparison with the steady advancement of the automobile industry as a whole make it perhaps easier to realize that the up-movement never gained much ground among the buying public in Europe. The American manufacture of electric motors and of batteries, which has been tabulated in official statistics, gives the clue. The number of electric motors made and used for automobile purposes increased 586 per cent. from 1899 to the end of 1909, but their value increased only 142 per cent. The horsepower fell from 14.5 to an average of 6.5 in 1909. There were only 52 per cent. more electric vehicles in 1909 than in 1899. The value of the motors was $192,000 in 1899 and had fallen to $153,000 in 1904. In the five following years it rose again, reaching $294,000. The use of storage batteries for automobiles increased 188 per cent., numerically, in the same period.

These figures seem to reflect faithfully the first discouragement, the subsequent improvement of the electric equipment, especially the batteries, then the learning of how electric equipment should be treated and the organization of service, and finally a steady increase based on the experience gained. The drop in motor sizes indicates mainly the use of more than one motor for each vehicle, but also an improved efficiency of the motors at different speeds, due to improved design, insulation and bearings, and admitting the use of lower-rated motors for equal traction work.

Among the European countries, Germany offers more parallels with the United States than any other, so far as the develop-

ment of electromobiles is concerned. (In the nomenclature, a distinction between automobiles and electromobiles is there almost established.) The electrical business interests are strongly concentrated there as here, a wide diffusion of electrical knowledge, obtained in public and trade schools, had prepared the ground, and the street and interurban trolley lines were springing into successful operation everywhere. Curiously enough, however, Germany has established no special statistics for electric automobiles. Only in the accident statistics of automobile traffic in general a distinction may be found since 1906. The total number of automobiles in Germany in 1907 was 25,815, which grew to 53,478 in 1911. Out of the latter, 4,327 vehicles were mainly engaged in the transportation of goods. Now the traffic accidents within the empire are recorded in part as follows:

	1906-07.	1907-08.	1908-09.	1909-10.
Personal traffic.				
Electric vehicles	462	548	585	520
Benzine vehicles	3,188	3,291	4,237	4,567
Goods traffic.				
Electric vehicles	8	18	25	45
Benzine vehicles	282	326	409	566

It seems clear from these figures that there must have been almost as many electric carriages in 1907 as in 1910, while the total number of electric trucks was very small, but, on the other hand, showed a large relative increase during the same period. And it seems reasonable to infer that the electric carriages were mainly those left over from the brief electric boom period which ended in collapse before 1906, while the steady increase in electric trucks corresponds, on a small scale, to the cautious advancement in the exploitation of electric traction for centralized work which marked the same period in the United States. As about 4,000 commercial benzine motor vehicles produced 566 accidents in Germany in 1910, while for the same year 520 accidents are recorded for electric pleasure carriages (many of the "accidents" being very trivial), it seems certain that the total number of electric carriages left over from the boom, together with the few added later, did not exceed 4,000.

American Batteries Competing

WITH regard to the most recent development of the electric vehicle in Germany it is characteristic that a branch manufacture for Edison batteries has been fully established there and gives sharp competition to the lead batteries of the German "Kartell," or trust. At the recent automobile show in Berlin, an electromobile with hub motor, manufactured by Gebhard & Harhorn, of Berlin-Schöneberg, and called the "Geha," attracted considerable attention beside the more pretentious cabs and landaulets of the Neue Automobil Gesellschaft, which is an offshoot of the Allgemeine Elektrizitäts Gesellschaft, alias the trust. In the "Geha" construction the armature and field turn in opposite directions, the field going against the direction of motion, and a good efficiency is thereby obtained for motors of small dimensions and high speed. This feature of design is applied to tricycle carriers with load capacities of 750 and 1,500 pounds, to a tricar with open or closed carriage work, to a tricar landaulet or cab and finally to a small four-wheeled electromobile.

From the annual report of the Allgemeine Elektrizitäts Gesellschaft, in whose economy a factory for electric carriages and trucks is a relatively small factor, but one near to the pulse of the situation, it is learned that the affiliated concern, the aforementioned Neue Automobil Gesellschaft, Ltd., has increased its number of workmen by 500 hands during the business year September, 1909, to 1910, and its sales 50 per cent. The report speaks of the wide recognition now accorded its electric pleasure vehicles and of the "ever-growing demand" for them. Its producing organization for electromobiles has been transformed into a separate corporation with a capital of 3,000,000 mark, through co-operation with affiliated firms.

A summary of the situation in Germany, with illustrations, is given in *Elektrische Kraftbetriebe und Bahnen* of September 24, 1911. It may be rendered in substance as follows:

"The great improvement of benzine motor cars has pushed electromobiles far into the background. The latter enjoys, at at least in Germany, only a very limited field of applications.

"The most notable uses relate to ambulance work, in which cost, radius and speed are subordinate factors, while smooth driving and absence of odor are in its favor; to postal work, to fire service and to street cleaning. The postal authorities of Berlin have found electro-tricycles practicable for the collection of letters and employ them in two styles—tricycles and 'cyclonettes' or tricars.

"For cabs, the electric system, requiring large organization—under which the cabs are likely to receive rough treatment from the hired drivers—has not proved profitable. The public likes the benzine cabs better. Even the 'Biedermeier' style (the word Biedermeier is symbolic of the 'solid citizen') of the N. A. G. (Neue Automobil Gesellschaft) manufacture cannot charm the average devotee of the 'Droschke.'

"It is different for commercial electromobiles. Following the American example, the business world is now slowly allowing the electric truck to make its way into some forms of centralized transportation work.

"In electric fire engines, postal wagons and street-cleaning equipment Germany is leading. These types are highly developed, while here America is limping along behind the procession."

Details of German Postal Wagons

SOME of the detail given with regard to the postal wagons may be of interest. In 1910 the Imperial Directorate of Posts in Berlin installed twenty-five new Lloyd-Krieger mail wagons after trying three for 1 year. They were built by the Norddeutsche Automobil und Motoren Aktien Gesellschaft, of Bremen; and Copenhagen, Denmark, is now experimenting with the same type of vehicle. This firm's electric cabs are well known in Berlin, Hamburg, Munich, Düsseldorf, Frankfurt a. M., Bremen and Amsterdam. The mail wagons are front-driven. The motor is fixed on the axle and drives by bevel pinion without interference with the steering, as the steering pivot is in line with the ground contact of the wheel. The front wheels are braked electrically, the rear ones mechanically. The maximum speed is 20 kilometers (12.4 miles) per hour. The battery gives 70 to 80 kilometers (43 to 50 miles) per charge. The battery maintenance is assumed by the Accumulatoren Fabrik Aktien Gesellschaft, of Berlin-Hagen, at a fixed charge per kilometer. The tire makers guarantee 15,000 kilometers.

The principal reason given by the postal authorities for preferring the electromobiles to benzine-driven cars is that the electromobile can be kept as good as new at a fixed yearly expenditure. It is definitely known in advance what the repairs will cost and what they will consist in. Depreciation is not over 10 per cent. Dealing with public bodies, this advantage is paramount, as these are governed by a budget.

Fire Commissioner Reichel, of Berlin, who has been at work since 1905 developing not only the fire protection for that city, but also for a network of other cities comprising the imperial fire district, in which each unit depends in part upon the facilities of the others and therefore upon rapid transportation of the fire-fighting equipment, writes in *Der Motorwagen* for July 31, 1911, that continued trial of six complete fire batteries, each composed of four vehicles, has proved them to be very reliable for all city fire-fighting, and for 1912 three more batteries of four vehicles will be installed. He states positively that, so long as he remains at the head of the service, no other power than electric will be used within the city limits for the fire-fighting apparatus proper. The total conversion from horses to motor power involves twenty batteries. For out-of-town work, on the other hand, he prefers steam, for the reason that when arrived at the seat of trouble it is necessary to pump water and the steam pumps have proved superior to other types. Otherwise the benzine motor car might do as well or better, he admits. For administrative and similar work, his department used, in 1911, thirteen benzine motor cars and eight more were ordered for

1912. The complete conversion of the system will take five years, and at the end of that period Berlin will have a fire department equipped with eighty electric fire-fighting vehicles, twenty-one steam or benzine vehicles for suburban use and forty-four benzine vehicles for administrative work.

Another German city, Munich in Bavaria, praises the benzine motor vehicle with electric transmission system for fire service. In comparison with the ordinary benzine motor vehicle, the advantage is noted that the electric current may be used for searchlight work at the fire and for driving machine tools for repair work at the station. The "mixed" system also leaves a free space under the rear axle which affords useful space for utensils, such as folding-ladders. The smooth, easy stops and starts which go with the electric drive render it possible for the crew to work with the ladders before the final stop is made, often gaining considerable time. It is also considered important that electric vehicles, and benzine-electrics as well, can both be started without cranking, and, as to simplicity in driving-control, the benzine-electric is ahead, no step-controller being used, but only the gasoline motor throttle.

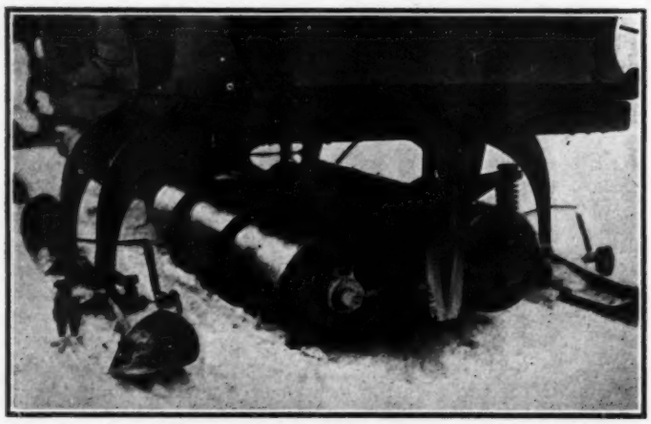
Six electric street-washing and sprinkling wagons are now in use in Berlin. They were furnished by Hentschel & Company in 1910. Twenty-two more are to be converted to this type. The city of Strasburg, too, has one of these. Fürth, in Bavaria, has a garbage collection system in which an electric tractor is used. By its use the capacity of the collecting unit is increased by the addition of a compartment in the tractor. It is made by Justus C. Braun, of Nuremberg. Altogether the tractor and fore-carriage systems are looked upon with some favor in Europe. The electric trucks turned out by Robinson & Company, of Antwerp, Belgium, are designed on the fore-carriage principle, like the Latil gasoline motor trucks of France.

Germany Leads in Railless Cars

NO other country on the European continent approaches Germany in employment of electric storage batteries for railless transportation.

The situation in England seems to favor the mixed type. In a lengthy article on "Electric Transport" in *The Engineer*, London, of November 24, 1911, the space devoted to the road vehicles is small and the author opens his discussion with the statement that "road vehicles worked with storage batteries are by no means common in this country (Great Britain), and it does not seem probable that they will ever meet with extensive use. Trials with omnibuses and cabs from time to time have proved commercial failures. Edison batteries have not replaced lead batteries."

From the details supplied it is learned, however, that the Electromobile Company of Mayfair has built "a good many" electric broughams, used in the wealthier portions of London. These have underslung batteries of 45 E. P. S., which weigh 10 cwt. (1,200 pounds) and propel a victoria 35 miles over fair roads. The Cedes Electric Traction Company, of Great Portland street, London, W., makes similar vehicles, mostly for export. Johnson & Phillips build "Cedes" commercial vehicles for England, the variety comprising omnibuses, trucks, fire engines and ambulances. The Vienna fire department recently tested the "Cedes" electric equipment against horses, gasoline and steam and found it the cheapest. A "first-aid fire van" of this make weighs 5 tons 10 cwt. (11,200 pounds), all up, and reaches a speed of 26 miles on the level and 15 miles on a grade of 1 to 12. The motors are in the hubs of the wheels, the field receiving the battery current by means of a cable through the wheel axle.



Close view of the driving cylinders of the Remegi sleigh

Some Details of Railless Systems

THE mixed system has been tried in different forms with varying success. One of the latest developments in this line is the gas-electric identified with W. A. Stevens, Ltd., of Maidstone. The Tillings Omnibus Company, of London, has been trying this out and will apply it to all their vehicles, it is stated. It is quite simple. A dynamo, a motor and a reversing switch are the principal parts. No clutch is used. The dynamo is coupled to the flywheel of the gasoline engine by a flat leaf-spring coupling which allows for misalignment with the armature shaft of the dynamo. The propeller shaft is 7 feet long, universally coupled to the armature shaft of the motor and to the rear axle by a "sliding toothed joint."

On upgrades—or whenever the gasoline engine is fully loaded—when the demand for current is further increased, a special design of the generator allows the increase by simultaneously lowering the voltage, so as to give less speed with higher torque.

In the Daimler gas-electric system for omnibuses—another recent development—storage batteries are used in conjunction with two "dynamotors," being dynamos which are also used as motors. Two 12-horsepower Knight engines, each transmitting power to one rear wheel through the armature shaft of its "dynamotor," do this ordinarily without electric assistance and in addition put current into a battery from the dynamos. Only when power is needed and the excitation of the dynamos is weakened, the dynamos begin to act as motors and draw on the battery. A rheostat regulates the excitation of the dynamos, and these are ordinarily connected in parallel, but this is changed to series, by means of a lever, when a steering movement is required involving a notable difference in the travel of the two driving wheels.

There are at least five railless trolley lines in Germany, one in France and one in England.

From the *Electric Journal* of October, pp. 817 to 822, it is learned that the important improvements of electric motors developed in the United States in connection with the electric locomotives of the New York, New Haven & Hartford and the Pennsylvania railway systems have not yet been applied to electric traction for road vehicles in any part of Europe. They relate to forced ventilation for the electric motors, resulting in increased efficiency and therefore in reduction of weights and sizes, and to a method for getting efficiency for slow as well as for fast work by regulating the field. This gives four natural "speeds" instead of two, for two motors, allowing the following adjustments without waste of current: (1) series with field reinforced, (2) series with field normal, (3) parallel with field reinforced and (4) parallel with field normal. This use of motors with reinforced fields has also been tried out on some of the interurban electric roads in America and must eventually reach the electric road vehicle.

American Cars in Swedish Run

OUT of forty-one automobiles which started in the great winter endurance and reliability run held in Sweden, February 4 to 6, over the picturesque route from Stockholm to Gothenburg and return, thirty-four finished in good order, and among these were seven American cars, namely, one Cadillac, one Pope-Hartford, three Fords, one Overland and one Buick. Nearly all of the other cars were of celebrated European makes.

Novel Motor Sled

Two Cylinders with Helical Driving Flanges Against Snow

NOT only in the wilds of the North, where traffic is too infrequent to command any effort from industry and commerce for meeting its requirements, but also in many regions within or immediately adjacent to busy civilization, the snow-covered road or trail is the rule for from 5 to 8 months of the year, and these roads, whether the snow is soft or hard, afford better and smoother running for sleighs than for wheeled vehicles. For the transportation of large loads the sleigh is, indeed, indispensable. Large portions of Canada and Alaska, of Siberia, Manchuria, Russia and of the Scandinavian peninsula have an actual transportation problem for the long winter which it would pay to solve definitely. The greater the distances, the worse the roads, the more inclement the weather and the more urgent the travel which must take place under these conditions, the more pronounced is the need of replacing horses, stabling and feed stations with motors and fuel supplies. So far, however, not one of the three elements in motor sleighing which require the attention of the designer has been properly developed, nor has been generally accepted as near enough right to serve as basis for manufacture. Neither traction, steering nor braking has been brought to a point of efficiency, and before this is done, the extent of the possible utility of motor sleighs and of the commercial demand for them, which necessarily awaits the perfecting of their mechanism as well as an adjustment of their cost of production to the conditions under which they would be required to be operated can only be surmised.

One of the most recent attempts at solving this problem comes from Chamonix, Switzerland, well known to European tourists —where snow, wealth, industrial activity and sport are perhaps in closer relations than anywhere else on earth—and is illustrated in the accompanying pictures of the Remezi sleigh. The characteristic features are the two co-ordinated cylinders with helical driving flanges which jointly give a straight-forward push and are held in driving contact with the ground, or the firm snow, by the compensated spring arrangement shown most clearly in the rear detail view; the pronged brakes pivoted on the rear runners and intended to be operated by a tension wire acting against the automatic release-spring ordinarily holding the prongs above the runner level, and the utilization of the exhaust for keeping the driving connection between the propeller shaft and the worm-cylinders free from icy accumulations. Apparently the designer has shrunk from employing the irreversible driving cylinders as brakes, with a view to saving the transmission gears and the helical flanges from too severe working strains. As steering in an emergency cannot be depended upon from the mere action of turning the front runners, which is not by any means equal in efficiency to the action which may be obtained from the feet of a draft animal—especially the feet of a reindeer—the one-sided use of the rear brake is perhaps also contemplated for steering purposes, since rapid and reliable emergency steering is one of the unavoidable features in all traffic over the snow and must become still more necessary with the high speeds expected of a motor sleigh.

Little Bits of Foreign News

An annual prize of 1000 francs is offered by the agricultural committee of the Automobile Club of France for the farmer who makes the best use of motor power for farm work.

Three Ford and two Reo cars are entered for the Tour de France endurance test, which takes place in France during the first three weeks of March.

Calendar of Events

What the Coming Events Have in Store for the Automobilist

Shows

Feb. 24-March 2... Brooklyn, N. Y., Twenty-third Regiment Armory, Annual Show, Brooklyn Motor Vehicle Dealers' Association.
Feb. 26-March 2... Paterson, N. J., Annual Show, Fifth Regiment Armory, Paterson Automobile Trade Association.
Feb. 26-March 3... Quincy, Ill., Highland Park Stone Pavilion, Annual Mississippi Valley Show, Quincy Auto Club.
Feb. 26-March 3.... Erie, Pa., First Annual Show, Erie Auto Dealers' Association.
Feb. 26-28..... Charlotte, N. C., Annual Show, Charlotte Automobile Dealers' Association.
Feb. 27-March 2... Elmira, N. Y., Second Annual Show, Elmira Automobile Club.
Feb. 28-March 2... Davenport, Iowa, Annual Show, Davenport Automobile Association.
Feb. 29-March 2... Fort Wayne, Ind., Fort Wayne Automobile Show Association.
March 2-9..... Reading, Pa., Reading Railroad Shops, Annual Show, Dealers' Association, Inc.
March 2-9..... Columbus, Ohio, Annual Show, Columbus Automobile Club.
March 4-9..... Reading, Pa., Reading Railroad Shops, Annual Show, American Exposition Company.
March 4-9..... Des Moines, Iowa, Annual Show, Des Moines Automobile Dealers' Association.
March 4-9..... Montgomery, Ala., Track Races, Alabama Automobile Association.
March 5-6..... Madison, Wis., First Annual Show, New Market Building, Madison Automobile Dealers' Association.
March 6-9..... Louisville, Ky., Fifth Annual Show, First Regiment Armory, Louisville Automobile Dealers' Association.
March 6-9..... Tiffin, Ohio, Second Annual Show, The *Advertiser*.
March 12-16..... Denver, Colo., Auditorium, Annual Show, *Motor Field*, A. Wahlgreen, Manager.
March 12-16..... Syracuse, N. Y., Fourth Annual Show, State Armory, Syracuse Automobile Dealers' Association.
March 13-16..... Muncie, Ind., Annual Show, Auditorium.
March 17..... San Jose, Cal., Track Races.
March 25-30..... Indianapolis, Ind., Annual Show, University Park, Indianapolis Automobile Trade Association.
April 8-13..... Oswego, N. Y., Annual Show, Company D, Armory.
Sept. ..... New York City, Rubber Show, Grand Central Palace.

Race Meets, Runs, Hill Climbs, Etc.

April 27..... Philadelphia, Pa., Annual Roadability Run, Quaker City Motor Club.
May 4..... Santa Monica, Cal., Annual Road Race, Motor Car Dealers' Association.
May 14-17..... Chicago, Ill., Commercial Vehicle Test, Chicago Motor Club.
May 30..... Indianapolis, Ind., Speedway, 500-mile race.
May 30..... Salem, N. H., Track Races, Rockingham Park.
June 20..... Algonquin, Ill., Annual Hill-Climb, Chicago Motor Club.
Aug. 8-10..... Galveston, Tex., Beach Meet.
Aug. 23-24..... Elgin, Ill., National Stock Car Races, Chicago Motor Club.
Sept. 2..... Indianapolis, Ind., Track Races, Speedway.
Oct. 5..... Philadelphia, Pa., Annual Fairmont Park Road Race, Quaker City Motor Club.
Oct. 7-11..... Chicago, Ill., Reliability Run, Chicago Motor Club.

How the Remezi sleigh looks when ready for action

THE AUTOMOBILE

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The Electric Vehicle

MUCH attention is being given at present to the electric vehicle for heavy trucking and light delivery work. The makers of electric commercial vehicles have awakened to the broader field of usefulness, the electric power companies in the different cities have co-operated with them, and there has been new enthusiasm infused into the minds of the public.

From the viewpoint of installation the electric vehicle appeals more to the buyer than the gasoline machine. When the buyer is considering a commercial truck he wants to figure accurately on costs of operation, on depreciation, and on cost of installation. He can do this with the greatest accuracy in the electric field. The electric motor is so well known a quantity that its performance, its current consumption and its life can be computed accurately. This part of the electric vehicle does not offer any obstacle to the buyer.

With the tires, the same is true as with the gasoline machine, it being now possible to purchase tires with a mileage guarantee ranging all the way from 6000 to 10,000 miles. With such guarantees the unknown quantity about the truck is removed, so far as tires are concerned.

When it comes to batteries it is possible to get good satisfaction from many of the battery makers. A few of the more radical ones will guarantee mileage or a certain period of useful life. Others more conservative give more rational assurances of maintenance. In the end the battery is a much more tangible quantity than it was a year or so ago and so it aids in making it possible to estimate the cost of electric vehicles.

When the tire man, the battery man and the motor man have done their parts it remains for the truck maker to bear his share of the burden. It is up to him to give the necessary assurances on the maintenance of the running parts of the vehicle. The wearing parts, such as bearings, piston rings, and certain gears may wear and must be replaced. The buyer knows this. But there are many non-wearing parts of the vehicle, such as frame, steering parts, axles, etc., that are subject to little wear and their period of life will be over 10 years. The history of several electrical vehicles in the city of New York proves this.

Because of these many factors which have already been worked out to a nicety it is quite possible to almost satisfy the buyer of electric vehicles. If he is worried about the cost of current this can be entirely settled before buying, because the demonstrating truck has fitted those necessary instruments, ammeter and voltmeter, by the constant reading of which the actual current consumption can be calculated.

One big reason why the electric vehicle appeals strongly to many proprietors using horse-drawn vehicles is that the operation of driving is so simple that the horse driver soon becomes an adept. The vehicle owner appreciates this as he prefers to keep his old employees whom he has selected after much study and who are entirely familiar with every detail of the work. The old driver is familiar with all of the ins and outs of street traffic, of getting to the loading door at the railroad depot or wharf, and is a trustworthy person when it comes to making deliveries where cash collections have to be made. All of these are considerations which appeal to the buyer, and they will have their force when the selling arguments are being made.

One of the big fields for the electric truck is in thickly congested territory and where the work is in short hauls from a railroad freight-house to a warehouse or wholesale store. The electric truck of 5 or 7-ton capacity is ideally suited for this work. Such capacity of vehicle brings about a big reduction in cost of operation as compared with using much lower capacity horse trucks. The electric vehicle maker has been quick to recognize this, and this is one of the departments in which this type of freight vehicle seems to fit with special appropriateness.

A fortunate feature of the truck situation today is that the old rivalry between the electric maker and the gasoline maker is vanishing. Today it is the truck against the horse, and not the electric against the gasoline, or vice versa. This is as it should be. There is room enough for all. It calls for the co-operation of all to bring the motor truck to that stature in the metropolitan transportation field that it must attain. There are places in which the electric vehicle is superior to the gasoline machine; and on the other hand there are places where it is impossible to use the electric machine but where the gasoline type is *par excellence*. Mixed services are being used in all of the big cities and there will be an increase of these. Let both the gasoline and electric truck people fight side by side, the strength of both is needed, and let this strength be expended against the common rival and not against each other.

What's New in Touring World

Proposal to Establish the Touring Club of Canada in Affiliation With T. C. A. Meets Approval

MONTREAL, Feb. 24—The proposal to establish a Touring Club of Canada, affiliated with the Touring Club of America, with branches in Ottawa and Toronto, was made at a luncheon given at the St. Regis Hotel February 22 by George A. Simard, vice-president of the Quebec-Miami International Highway Association. Mayor Lavallee, Armand Chaput, president of the Chambre de Commerce; Howard D. Hadley, of Plattsburg, president of the International Highway Association; C. H. McMillen, chairman of the executive board of governors of the Touring Club of America, and F. H. Elliott, secretary, were among those present.

The suggestion to form a Touring Club of Canada was made by Mr. Elliott, supported by Mr. McMillen, and the scheme met with general approval. Mr. McMillen described the object and work of the Touring Club of America, and spoke of the interest taken in the good roads question. He suggested the formation of a Touring Club of Canada, to have headquarters in Montreal, just as soon as the road conditions warrant it. The club would be affiliated with the Touring Club of America and would exchange information.

George A. Simard said that the Province of Quebec was entering upon a new era in the construction of good roads, and by the fall of 1912 a modern macadam highway, 40 miles in length, would be built from the border at Rouses Point to Montreal.

I.A.A.C. After Standard Triptych

LONDON, Feb. 20—Standardizing the triptych used by automobile tourists in foreign lands is being considered by a special customs committee of the International Association of Automobile Clubs, of which the Automobile Club of America is a member.

Heretofore the triptych issued by each country in Europe had a different form and language, but the committee is preparing to report that a standard has been adopted so that travelers will not be subjected to the trouble of securing new passports upon entering each country traversed. The new plan will do away with the annoyance of numerous deposits at the frontiers, and will provide for re-entry into a country after having passed on to another without further formalities.

Mississippi Levee for Touring

VICKSBURG, MISS., Feb. 26—Touring from south to north along the Mississippi River levees is suggested by Major Lee Richardson, agent of the Studebaker line at Vicksburg.

Major Richardson, who proposes taking a party of Flanders and E-M-F owners on the tour, says that such a trip is feasible providing permission can be obtained from the United States government, which has charge of the levees.

He points out that the levee is high and dry, smooth and passable throughout its length and would make an ideal road.

Sentiment favorable to such an undertaking is being worked up along the route.

Virginia Helping Trunk Route

RICHMOND, VA., Feb. 26—It is estimated that Virginia's part of the Quebec-to-Miami highway can be constructed for $200,000. Of this Richmond will raise $75,000 and the balance will be raised by personal subscriptions throughout the state. Other states through which the highway passes—New York, New Jersey, Delaware, Maryland, North Carolina, South Carolina, Georgia and Florida—have completed their part of the road.

Outline of Coming Contests

Chicago Club Planning Four Team Matches —Indianapolis Preparing for Active Season—Four-City Tour

CHICAGO, Feb. 26—The Chicago Automobile Club, pioneer in the matter of team matches, has determined, if possible, to stage four of these interesting affairs during the summer of 1912. The leading event will be the fifth annual interclub match with the Chicago Athletic Association, which probably will take place in June. A trade versus amateur match among members of the C. A. C. will be put on in July, while in August it is proposed to have an intercity interclub match with the Milwaukee Automobile Club. A fall match with the Chicago Athletic Association for a new trophy, which will be put up by Allen S. Ray, of the Chicago Automobile Club, is offered for September.

Wolverines to Tour to Indianapolis

DETROIT, MICH., Feb. 26—Arrangements have been completed by the runs and tours committee of the Wolverine Automobile Club for the run to Indianapolis May 28, on the occasion of the grand challenge race. The committee has assurance that fully 100 will participate, and Chairman H. H. Robinson has reserved that many seats in stand "A," directly across from the pits. This run will mark the opening of the touring season for the Wolverines. The club is enjoying a remarkable growth. Its membership now numbers 1,643, and the officers will soon be confronted with the necessity of securing a club house.

Hoosiers Plan Week-End Runs

INDIANAPOLIS, IND., Feb. 26—A series of five week-end runs, the initial run to be made about June 1, is being arranged by the Hoosier Motor Club, which expects to have a busy season. These runs, which are to be purely social in nature, are to be to Brookville, Mudlavia Springs, French Lick, Lake Manitou and Madison. Each run will start Saturday at noon, spending the night at the terminal and returning home Sunday.

The club will try to have Indianapolis made the starting point for the A. A. A. Reliability, the four-states run for Indiana-made cars and for the tri-city club run in which the Wolverine Club, Detroit, the Chicago Motor Club and the Hoosier Motor Club will participate.

Four-City Reliability Run Planned

WASHINGTON, D. C., Feb. 26—A plan is on foot to have a seven-day reliability run in June under the joint auspices of the Automobile Club of Washington, Automobile Club of Maryland and the Automobile Clubs of Norfolk and Richmond. It will be known as a four-city tour, starting and finishing in Washington. The route, as proposed, is to Baltimore, Wilmington, Del.; Salisbury, Md.; Cape Charles, Va., thence by ferry to Norfolk. From this point the route will be to Richmond, thence to Staunton, up the Shenandoah Valley to Winchester, then to Harper's Ferry, W. Va., and return to Washington *via* Frederick.

ATLANTA, GA., Feb. 24—So successful was the show given by the Atlanta Automobile and Accessory Dealers' Association that this body is now planning to revive the Atlanta hill-climb.

PORTLAND, ME., Feb. 26—The blue ribbon event of automobile racing in the East this summer will be the three-day speed program on the beach at Old Orchard, Me., which is scheduled for July 4, 5 and 6.

NEWS of the WEEK CONDENSED

Fleet of six Sampson trucks which is saving money for Kansas City's street cleaning department

KANSAS CITY PLEASED—The taxpayers of Kansas City have benefited to the extent of $5,000 a month by the use of automobile trucks in the street-cleaning department. It is found that each truck does the work of seven to nine horse-drawn wagons. The trucks do all sorts of work in connection with cleaning and repairing the streets. Six Sampsons comprise the fleet.

Spaldings to Handle King—A. G. Spalding & Brothers will act as agents for the King car in New York, Philadelphia and Newark.

Barnett Adds Federal—W. W. Barnett, Denver, Colo., agent for the Stoddard-Dayton and Alco, has taken on the Federal truck.

Gutelius Resigns—Nelson T. Gutelius, who recently became sales manager for the Midland Motor Company, Moline, Ill., has resigned.

DeWitt to Sell Knox—Dean DeWitt, Columbus, has taken the central Ohio agency for the Knox, both pleasure cars and commercial trucks.

Baldwin Heads King Publicity—W. E. Baldwin has been placed in charge of the publicity department of the King Motor Company, Detroit, Mich.

Wise to Distribute King—The Boston, Mass., branch of S. J. Wise & Company has been appointed distributor of the King car in the New England States.

Felker to Sell Trucks—The Felker Auto Company, Denver, Col., has taken the agency for Mack and Saurer trucks for Colorado, Wyoming and New Mexico.

Sitgreaves Takes Simplex—The Sitgreaves Auto Livery Company, 44 West Capital street, Columbus, O., has taken the agency for the Simplex in central Ohio.

McCreary Handles Grabowsky—Louis S. McCreary has taken the New England agency for the Grabowsky truck and will make his headquarters in Boston. It was formerly a factory branch.

Cooney Opens Agency—J. A. Cooney has opened a salesroom at Little Falls, N. Y. Mr. Cooney has the agency for the Abbott-Detroit, Marion and Selden gasoline cars and for the Baker electrics.

New Abbott-Detroit Agents—The Abbott Motor Company, Detroit, Mich., has appointed the White Automobile Company, Baltimore, Md., distributor of the Abbott-Detroit car for Maryland and Virginia.

J. Stewart Smith Moves—J. Stewart Smith, who is associated with a number of supply companies, has given up his office at 1779 Broadway, New York City, and has moved to larger quarters at 250 West Fifty-fourth street.

'Buses for Laporte—An automobile car line, in lieu of street car service, is the prospect for Laporte, Ind. It is the intention to serve all parts of the city by means of large 'buses, which will have a seating capacity of from twenty to twenty-five each, and to give 20-minute service.

Ottawa Company to Reopen—The Pink, McVeity & Blackburn Company, Ottawa, Ont., is representing ten makes of cars comprising Franklin, Hudson, Chalmers, McLaughlin, R. C. Hupp, Lozier, Peerless, White cars and trucks, Stevens-Duryea. The formal opening of the company's newly rebuilt showrooms and garage will be held on April 1.

Mansfield Elects Officers—The Mansfield Tire & Rubber Company, incorporated recently with a capital of $50,000 to take over the plant of the old Mansfield Rubber Company, which is in financial difficulties, has elected the following officers: Judge C. R. Grant, president; George W. Henne, vice-president and general manager; Jesse E. LaDow, secretary, and Walter F. Henne, treasurer.

Schur Files Suit—A. J. Schur, trustee in bankruptcy of the Norwalk Motor Car Company, has filed a suit against the Norwalk National Bank of Norwalk, O., to collect a note of $5,017.46 claimed to have been paid to the bank within a few months prior to the bankruptcy proceedings. It is alleged that the time the note was paid the officers of the motor car company knew the corporation was insolvent.

Haynes in Marietta—The Marietta Motor Car Company, Marietta, O., has taken the agency for the Haynes.

Bardshar Has R. C. H.—F. H. Bardshar, Seattle, Wash., has the general distributing agency for the R. C. H. in that state.

Franklin in Texas—Birdsong & Patchernick have secured the dealership for the Franklin car in San Antonio, Tex., for the present season.

Syracuse Club Grows—The membership of the Automobile Club of Syracuse, N. Y., took a jump from 609 in February, 1911, to 830 in February, 1912.

Nashville Has Pullman Agent—The Ford Motor Sales Company, Nashville, Tenn., will act as the distributor for the Pullman line in that city and vicinity.

Clark Distributes Premier—The E. W. Clark Motor Car Company, Fond du Lac, Wis., has been appointed district distributor of the Premier in the Fox River valley.

Toledo Branch Opens—The Northern Ohio Punctureless Tire Company has opened a Toledo, O., branch. Lewis Neiset, Sr., is president of the concern and F. E. Neiset is manager.

Portland Company Reorganizes—The United Auto Company, Portland, Ore., agent for the Maxwell, Columbia and Sampson truck, has been reorganized. J. Riginsberger is now office manager.

National Invades Toledo—Another line was introduced to Toledo, O., last week when the National Motor Sales Company opened a branch on Madison avenue to distribute National cars in northwestern Ohio.

Greer-Robinson Grows—The Greer-Robinson Company, Los Angeles, Cal., agents for the Mitchell, have let the contract for a new building to cost $100,000. The structure is to be completed ir 3 months.

Kimmels Get New Line—Kimmel Brothers, 215 North Fourth street, Columbus, O., have taken the agency for the Hoover patent auxiliary spring or shock absorber for nine counties in central Ohio.

Bowman Takes Waverley—J. W. Bowman, agent for the Stevens-Duryea, has taken the Waverley electric for Boston and vicinity, which was formerly handled by the Dodge Motor Vehicle Company, of Cambridge.

Los Angeles Garage Opens—The California Automobile Company, representative for Firestone-Columbus and Warren gasoline cars and Columbus electrics in Los Angeles, Cal., has opened its new garage and salesrooms.

Taxicabs Replace Horses—The Toledo Transfer Company, of Toledo, O., has replaced its horse-drawn vehicles with taxicabs. Six Overland limousines were ordered, each car to have a seating capacity of six including the driver.

Taxicabs in Wilmington—The T. C. Bradford Company has started a new taxicab service in Wilmington, Del., with Ford cars. In an adjoining building, at Tenth and Tatnall streets, Grantley P. Postles has a Bergdoll taxicab service.

Branch for Hopkinsville—The Kentucky Automobile Company, Louisville, Ky., agents for the Cadillac in this territory, will erect a branch house at Hopkinsville, Ky. The plans call for a two-story structure, 76 by 120 feet, to cost $10,000.

Lane Buys Out Johnson—Bradley J. Lane has purchased from Otto Johnson his interest in the Syracuse Regal Company at 1205 West Genesee street, Syracuse, N. Y., and with W. F. O'Connor will conduct the business under the same name.

News from York—The permanent house committee and executive committee of the York Motor Club decided to purchase a building along the York and Wrightsville pike for use as a clubhouse. John P. Lecrone has opened the Lecrone Garage.

Garage for Sawyer—Edward Hunt and Gustave Lienau have formed a co-partnership and will open a garage and salesroom in the Schmidtke Building, Sawyer, Wis., on March 1. They will represent the Oakland and R. C. H. and conduct a repair shop.

Kalamazoo's New Garage—The newest garage in Kalamazoo, Mich., is the Globe, in which the third annual automobile show was given. It was built and is managed by William Clark, who represents the Chalmers, R. C. H., Nyberg and Hupp-Yeats electric.

N. G. E. A. to Meet in Milwaukee—The 1912 convention of the National Gas Engineers' Association will be held in Milwaukee, Wis., from June 17 to 22. About 700 delegates will attend. An exposition of gas engines and motors of all types will be held in connection with the meeting.

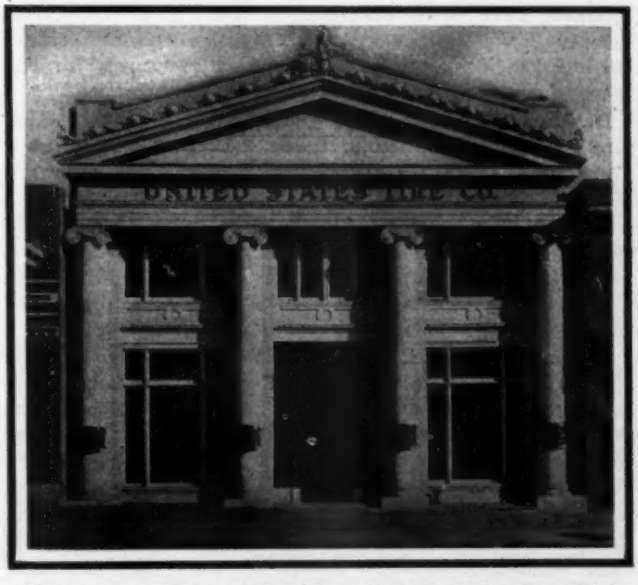
May Build Factory—Another proposition for the location of an automobile factory in Lima, O., has been made to D. F. O'Connor, president of the Progressive Association of Lima. It was presented by Mark Altschul, Henry Mack and W. A. Debo, of Detroit, and requires that Lima capitalists should put up $75,000 cash.

Columbus Falls Into Line—Motor-driven fire apparatus will be purchased by the city of Columbus, O., as a result of the action of the City Council, which authorized a bond issue of $50,000 for the purchase of the equipment. An ordinance appropriating money for an additional auto for the assistant chief of the fire department was also passed.

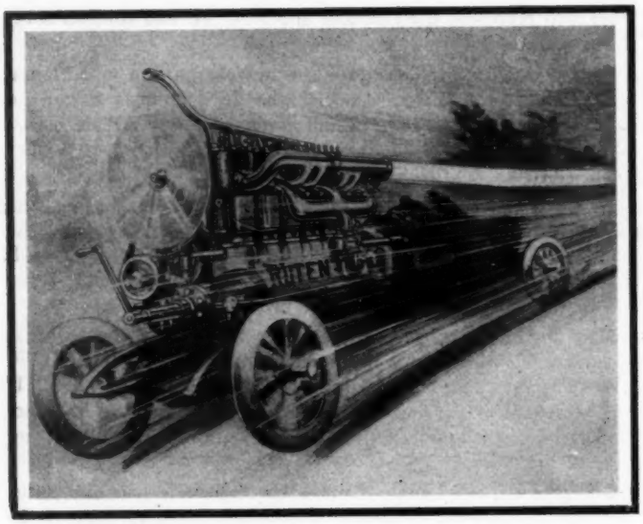
Rose Succeeds Sands—P. E. Sands has resigned his position as manager of the Seattle, Wash., branch of the Studebaker Corporation. L. H. Rose, Portland, Ore., will hereafter be in charge of the Northwest with the three distributing points of Seattle, Portland and Tacoma. H. Doherty manages the Tacoma branch and W. C. Garbe the Seattle branch.

News from Toronto—Peck Electric Limited is manufacturing the only electrically propelled vehicle made in Canada. A. E. Wilson has been appointed distributor in western Ontario for the Jackson. Electrical Specialities, Limited, has been appointed Ontario distributor for Gaulois tires. The Hess Motor Sales & Garage Company has secured the Canadian agency for the Ohio.

Ohio's Quarterly Report—According to the quarterly report of J. A. Shearer, register of the Ohio automobile department, the state treasury is enriched to the sum of $123,179.43 from the receipts for registration of motor cars and licensing of chauffeurs. During the quarter ending February 15 21,876 owners registered cars and chauffeurs were licensed to the number of 3,256. The money will be placed in the good roads fund.



New quarters of United States Tire Company in San Francisco



Novel advertising poster of Rutenber Motor Company

King Takes Franklin—Herbert King has taken the agency for Franklin cars in Bloomfield, Ia., and vicinity.

Rochester Garage to Move—The West Side Garage, Rochester, N. Y., is preparing to move into its new building at 11 Caledonia avenue, Rochester, about March 1.

Johnson Adds Premier—The E. C. Johnson Company, Broad and Spring Garden streets, Philadelphia, distributor of the Reo and American, has added the Premier.

Sintz with Miller Company—Guy Sintz, formerly factory manager of the Van Dyke Motor Car Company, has been appointed general factory manager for the Miller Car Company, Detroit, Mich.

Von Rottweiler Resigns—George von Rottweiler, chief engineer and factory manager of the Falls Machine Company, Sheboygan Falls, Wis., has resigned. The company manufactures gasoline motors.

Loco Opens Baltimore Branch—The Locomobile Company has established a branch store and service department in Baltimore, Md. The company's location in the future will be at 107 West Mount Royal avenue.

Installs Repair Shop—The Willis Motor Car Company, Syracuse, N. Y., has installed at its Montgomery street garage a completely equipped repair and paint shop, requiring two floors above the garage and salesrooms.

Leases Lake Mills Plant—The Lake Mills Automobile Company, Lake Mills, Wis., recently organized and incorporated, has leased the former Lake Mills Foundry Company's plant and is remodeling it into a garage, repair shop and salesroom.

Dahl in Philadelphia—The Dahl Punctureless Tire Company of Delaware, has opened headquarters at 1309 Race street, Philadelphia. Its territory comprises Pennsylvania, Delaware, Maryland, Virginia, West Virginia and western New York.

Eastman Company Moves—The Eastman Motor Car Company, Spokane, Wash., has moved its salesroom, office and service department to 1319 Second avenue, Spokane. The move was made to comply with the ordinance regarding the storing and handling of gasoline.

Langmaid Leaves Autocar—Chase Langmaid has resigned as manager of the Boston branch of the Autocar Company to handle the New England business of the Federal Rubber Company in conjunction with Guy D. Niles. Salesrooms have been opened at 261 Dartmouth street.

Grant to Sell Apperson—Harry F. Grant, the racing driver, twice winner of the Vanderbilt cup, has gone into business in Boston, Mass., having taken the agency for the Apperson, formerly handled by the W. L. Russell Company. He has opened salesrooms at 1020 Boylston street.

To Improve Santa Monica Course—The Santa Monica, Cal., council has appropriated $4,000 for the improvement of the race course and $1,000 for policing that portion of it lying within the city limits. The council also decided to devote $1,700 of the advertising fund for publicity booklets.

Remy Service Stations—Arrangements were completed recently with Child, Day & Churchill, Inc., Spokane, Wash.; Washington Auto Supply Company, Seattle, Wash., and the Archer & Wiggins Company, Portland, Ore., to act as Remy service stations in their respective cities.

Kiefer Leaves Franklin—H. G. Kiefer has resigned as assistant metallurgist of the H. H. Franklin Manufacturing Company, Syracuse, N. Y., to accept the position of chief metallurgist in the newly-created metallurgical department of the Timken Roller Bearing Company, of Canton, O.

Can't Restrain Engines—In its effort to have some restriction placed on motor fire engines, as regards speed, the city council of Wilmington, Del., has found that it has no right to do so as cars belonging to fire, police and other public safety departments are exempt from the state law, which obtains in the cities as well as in the country.

Weinstock-Nichols Moves—The Weinstock-Nichols Company, San Francisco, Cal., has moved into its new two-story building on Golden Gate avenue. In addition to the tire and accessory departments, the company operates repair shops for tires, magnetos, lighting systems and batteries, as well as a machine shop for fitting devices on automobiles.

New Quarters for S. & C.—The Stewart & Clark Manufacturing Company has moved its Minneapolis branch from 45 South Tenth street to 1202 Hennepin avenue, where it has larger quarters with facilities for installing speedometers, as well as a crew of men ready to make installations in either St. Paul or Minneapolis when required. The new office will be in charge of T. J. Snelling.

New Truck to Use Internal Gear Drive—The General Industrial & Manufacturing Company, of Indianapolis, Ind., has decided to use the internal-gear drive on its line of light delivery wagons. C. H. Wallerich, formerly assistant general manager of the Mais Truck Company, Indianapolis, Ind., is now general manager of the automobile department of the General Industrial & Manufacturing Company.

Premier, Ford and Firestone Move—The Premier and Ford cars and Firestone tires are now housed in a new building in the Back Bay section of Boston, Mass., near the homes of the Peerless and Autocar companies. The structure is divided into three separate parts, the Ford and Firestone occupying the outer sections and the Premier company the center.

New Abbott-Detroit headquarters in Detroit

Wellston Garage Takes Agencies—The Wellston Garage, Wellston, O., has taken the 1912 agency for the Overland, Jackson and Brush. In addition the concern sells the Dart trucks.

Rommel Company to Sell Marathon—The Rommel Motor Car Company, Louisville, agent for the Brush and White cars, has acquired the agency for the Marathon, which is made at Nashville, Tenn.

Hudson Change in Louisville—The Hudson, formerly sold here by the McCormick-Montenegro Company, will hereafter be sold by the Urwick Motor Car Company, local agent for the Baker electric and Marmon.

New Maxwell Agents in Illinois—The Gray Auto Garage, of this city, is now the exclusive Peoria, Ill., agent for the Maxwell automobiles. O. A. Johnson has been named as the agent for the Maxwells at Cambridge, Ill.

St. Paul Has New Wire Wagon—The St. Paul fire department has bought for $6,000 a combination chemical engine, hook and ladder and hose-cart to carry twelve men. The Mitsch & Heck Wagon Company, of St. Paul, built the woodwork.

Truck Carries Dead Horses—J. L. & H. Stadler, Cleveland, O., manufacturers of fertilizers, use a 1 1-2-ton White truck specially designed to facilitate the handling of dead horses, which are bought and hauled to the factory on the outskirts of the city.

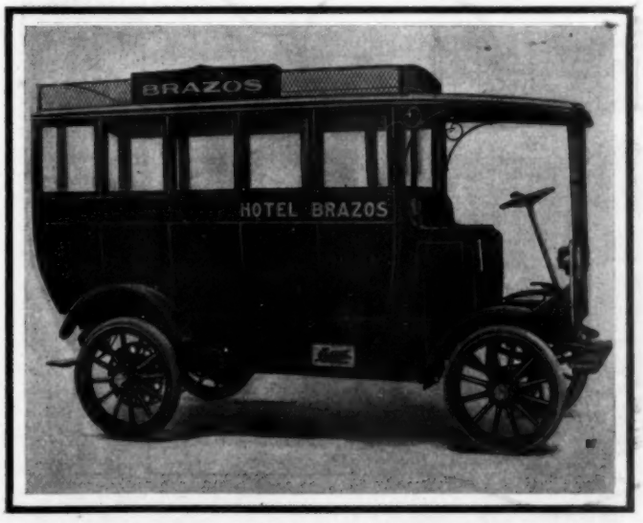
Robertson Joins Moon Forces—William L. Robertson, brother of George Robertson, the noted race driver, has signed with the Moon Motor Car Company, of New York, as a salesman. Mr. Robertson has been employed in a similar capacity by the Benz branch.

Electric 'Bus for Houston—The Hotel Brazos, Houston, Tex., has recently put into service a Detroit Electric hotel 'bus capable of seating fourteen and of carrying baggage on top of the vehicle. It is provided with electric lights and has a speed of 11 miles an hour.

Watertown 'Buses a Success—The pay-as-you-enter automobile omnibus line recently started in Watertown, N. Y., to cover a residential district from which street cars are excluded, is reported a thorough success even under the trying winter conditions of that high latitude.

Quinlan & Coe Take on Campbell—J. D. Quinlan and J. G. Coe, who have lately taken the Syracuse, N. Y., agency for the Schacht line of cars, have engaged Woodworth Campbell, formerly salesman for A. M. Zimbrich, agent in this city for Stoddard-Dayton cars, as their sales manager.

Collins Company Organized—The Collins Automobile Company has been organized by W. H. Collins and O. C. Collins, of Milwaukee, Wis., with headquarters at 19-21 East First street, Fond du Lac, Wis., to represent the Cutting, Herreshoff, National and Westcott in the Fox River territory.



Detroit Electric 'bus used by Hotel Brazos, Houston, Tex.

White truck used as hearse for Cleveland's defunct equines

Ignition Starter Opens Headquarters in Los Angeles—The Ignition Starter Company have recently opened headquarters in Los Angles, handling the Disco self-starter. George O. Seeley has been appointed manager. Sub-agencies have also been established in San Francisco, Portland, Tacoma and Seattle.

Automobile Uses High-grade Hides—It is reported by hide dealers in Texas that the development of the automobile business has created a new and extensive demand for the higher grade hides of Texas cattle. It is claimed that this new use to which hides are being put has caused them to advance materially in price.

Knight Transferred to Indianapolis—W. C. Knight, who has been in charge of the Cincinnati sales agency of the Warner Instrument Company, has been transferred to Indianapolis as manager of the branch in that city, succeeding J. C. Stiles. Mr. Stiles will go to St. Louis, where he will open a distributing branch for the company for the Southwest.

Long-Distance Talk by Chalmers—Hugh Chalmers, president of the Chalmers Motor Company, broke all records for long-distance speeches, Saturday afternoon, when he gave a 5-minute talk to the Boston Sales Managers' Club by telephone while sitting in his office at the Chalmers plant at Detroit. Mr. Chalmers talked on "Salesmanship and the Principles of Business Success."

Wolseley Company in Toronto—The Wolseley Tool & Car Car Company has awarded a contract to erect a $40,000 brick and stone garage at 81 Avenue road, Toronto, Ont. This warehouse is the first move of any English automobile manufacturer to establish themselves in Canada, and it is stated that if business warrants it, the Wolseley Syndicate will invest another half-million dollars in Canada in a motor factory.

Smith-Hoppe Garage Opens—The Smith-Hoppe Automobile Company, of Milwaukee, Wis., has opened its new garage. It will cater especially to electric car owners and has a splendid equipment, consisting of three black Monson slate panels with eight Allen-Bradley charging rheostats. This gives a capacity of twenty-five cars on charge at one time and gives the garage a daily charging capacity for approximately 80 cars.

Pierpont Goes to Olds—Robert Pierpont, for 2 1-2 years factory manager and engineer for the Olds Motor Works, Lansing, Mich., and previous to that factory engineer for the Buick Motor Company, Flint, Mich., has been appointed assistant general manager and production engineer of the King Motor Car Company, Detroit. He was general foreman for the Locomobile Company of America, at Bridgeport, Conn., for three years.

Another Canadian Car—The Diamond Arrow Motor Car Company, Ottawa, Ont., has begun to manufacture automobiles and are turning out two styles, a 38-horsepower passenger touring car and a roadster model developing 45 horsepower.

Louisville Waverley Branch—Another branch was added to Louisville's motor row recently when the Waverley Electric Company, of Indianapolis, Ind., moved into the showroom formerly occupied by Longest Brothers at 725-29 South Third avenue. P. W. Barr, of Louisville, has been placed in charge of the branch. Longest Brothers will still maintain an office in the building. They were formerly agents for the Waverley electric and the Stoddard-Dayton, but are now devoting their attention to the manufacture of the Longest truck.

Automobile Incorporation

AUTOMOBILES AND PARTS

BALTIMORE, MD.—Calvert Motor Company; capital, $10,000; to make automobiles. Incorporator: F. G. Kitchi.

BLOOMINGTON, ILL.—C. U. Williams & Son Company; capital, $100,000; to sell automobiles and repair them. Incorporators: C. U. Williams, W. W. Williams, S. R. Williams.

BROOKLYN, N. Y.—South Brooklyn Auto Livery & Sales Company; capital, $15,000; to do a general automobile business. Incorporators: C. Hohorst, C. H. Hohorst, J. B. Haff.

BUFFALO, N. Y.—Excelsior Sales Company; capital, $10,000; to sell automobiles. Incorporators: W. F. Hanavan, H. O. Wait, L. F. Donnelly.

CLIFFSIDE PARK.—Cliffside Motor & Supply Company; capital, $50,000; to conduct a general automobile business. Incorporators: A. E. Neumann, A. C. Neumann, J. H. Neumann, G. F. Walker, G. C. Bottorf.

CLEVELAND, O.—R. C. Hull Electric Company; capital, $10,000; to sell electrical supplies for automobiles. Incorporators: J. H. Cassidy, M. A. Copeland, W. S. Mitchell, J. A. Schlitz, G. B. Kennerdill.

DOVER, DEL.—Hansen Automobile Company; capital, $50,000; to make automobiles. Incorporators: E. Moore, Jr., P. C. Hansen, F. H. Broman.

FRANKFORT, OHIO.—Nicol Motor Car Company; capital, $1,000; to sell automobiles. Incorporators: R. C. Nicol, J. W. Nicol, W. D. Nicol.

HIGH POINT, N. C.—High Point Motor Company; capital, $50,000; to build automobiles. Incorporators: G. Wilson, S. L. Davis, J. E. Kirkman.

JERSEY CITY, N. J.—U. S. Rubberoline Manufacturing Company; capital, $50,000; to make artificial rubber. Incorporators: C. H. Weller, H. B. Hall, L. J. Cain.

LAKE MILLS, WIS.—Lake Mills Automobile Company; capital, $6,000; to sell automobiles. Incorporators: F. A. Pirwitz, A. Yoss, S. H. Kypke, G. H. Burns.

NEW YORK CITY.—Auto Selling Company; capital, $5,000; to deal in automobiles. Incorporators: T. D. Raymond, J. Greenberg, C. H. Streit.

NEW YORK CITY.—Jandorf Automobile Company; capital, $10,000; to do a general automobile business. Incorporators: H. R. Bliss, S. S. Meyers, L. C. Jandorf.

NEW YORK CITY.—Connell Company; capital, $2,000; to deal in automobiles. Incorporators: J. F. Connell, W. J. Connell, G. E. Edmunds.

NEW YORK CITY.—Fresh Air Auto Heating Company; capital, $1,000; to make automobiles. Incorporators: J. R. Duff, S. Matthews, B. A. Westervelt.

NEW YORK CITY.—Bussing Agency, Inc.; capital, $50,000; to sell automobiles. Incorporators: George Ozanne, A. C. Baldwin, J. V. Knoth.

NEW YORK CITY.—Rego Motor Company; capital, $20,000; to manufacture motors. Incorporators: G. C. Andrews, E. C. Gorham, T. F. Farrell.

NATICK, MASS.—Copethorne Demountable Rim Company; capital, $100,000; to make wheels, rims and tires. Incorporators: W. E. Copethorne, H. M. Ferguson.

NEWARK, N. J.—Acorn Tire & Supply Company; capital, $50,000; to make and sell automobiles and supplies. Incorporators: H. L. Carroll, P. C. Nissley, M. L'Anson.

NEW YORK CITY.—Motor Installation; capital, $30,000; to make motors and machinery. Incorporators: L. E. Judson, N. M. Brown, R. J. Kent.

ROCHESTER, N. Y.—La Brie Transmission Company; capital, $1,000; to manufacture motors, transmissions, etc. Incorporators: C. S. Knipp, G. D. Webster, P. A. Le Brie.

SCHENECTADY, N. Y.—Jay A. Richard Company; capital, $72,000; to make automobile goods. Incorporators: J. A. Richard, J. A. Richard, B. C. Wheaton.

ST. LOUIS, MO.—St. Louis Motor Truck Company; capital, $7,500; to build, buy and sell freight automobiles. Incorporators: C. H. Joerding, E. L. Haydock, J. P. Camp.

ST. LOUIS, MO.—Universal Motor Truck Traction Company; capital, $250,000; to manufacture automobile motors. Incorporators: W. H. Taylor, J. Beltram, A. R. Shaffer.

WATERVILLE, ME.—Morrison Motor Company; capital, $100,000; to deal in automobiles, agricultural implements. Incorporators: H. Morrison, M. Morrison.

WEST NEW YORK, N. J.—Hudson Automobile Exchange; capital, $100,000; to engage in the automobile business. Incorporators: A. Aragona, W. F. Burke, A. Shulman.

GARAGES AND ACCESSORIES

BATTLE CREEK, MICH.—Hayes Manufacturing Company; to make a self-starter. Incorporators: Fred C. Hayes, F. A. Buchner, A. J. Arnold, A. M. Minty, W. E. Goff, August Kapp, J. W. Emmerson, W. S. Hauch, Charles Hauch, J. D. Jones, W. L. Larkin, A. Z. Hollman, L. J. Charles, B. Z. Wines.

CANTON, OHIO.—Canton Top Rest Company; capital, $10,000; to manufacture automobile top rests. Incorporators: Percy R. Moore, Oliver E. Eschelmann, D. L. Holwick, C. W. Coe, C. W. Miller.

CHICAGO, ILL.—Boulevard Motor Delivery Company; capital, $2,500; to conduct a delivery business. Incorporators: C. H. McDonough, C. D. Black, Geo. H. Davis.

CHICAGO, ILL.—Chicago Cycle Supply Company; capital, $15,000; to make bicycle and automobile supplies. Incorporators: Hans P. Hanson, Charles J. McCormick, Richard J. Collins, Rogers & Mahoney.

CLEVELAND, OHIO.—United Auto Supply Company; capital, $25,000; to sell automobile accessories and supplies. Incorporators: C. J. Castle, William M. Theobald, C. W. Gabriel, C. A. Fagin, A. J. Sehm.

COLUMBUS, OHIO.—Rogers Supply & Tire Company; capital, $10,000; to manufacture tires and accessories. Incorporators: Don P. Mills, R. W. Sanborn, Paul S. Knight.

INDIANAPOLIS, IND.—Electro Light & Starter Company; capital, $500,000; to manufacture automobile lights. Incorporators: F. H. Wheeler, J. E. Bell, C. C. Wedding, S. C. Renick, H. J. Spann.

NEW YORK CITY.—Ess Auto Supply Corporation; capital, $500. Incorporators: John P. Morris, Herman Ottenberg, Leo Hecht.

OMAHA, NEB.—Storz Auto Supply Company; capital, $50,000; to do a general automobile supply business. Incorporators: Arthur Storz, Hal. M. Brady, Donald C. Troup.

PLAINFIELD, N. J.—Standard Automobile & Tire Company; capital, $25,000; to manufacture tires. Incorporators: H. P. Voseller, J. J. Slevin, F. Ivamy.

PONTIAC, MICH.—C. V. Taylor & Company; capital, $25,000; to manufacture tops and windshields. Incorporators: C. V. Taylor, John E. Mitchell, Margaret W. Taylor.

SCHENECTADY, N. Y.—Union Garage Company, Inc.; capital, $20,000; to conduct a garage. Incorporators: Charles H. Tefet, Llewellyn M. Miller, Bertram V. Tulloch.

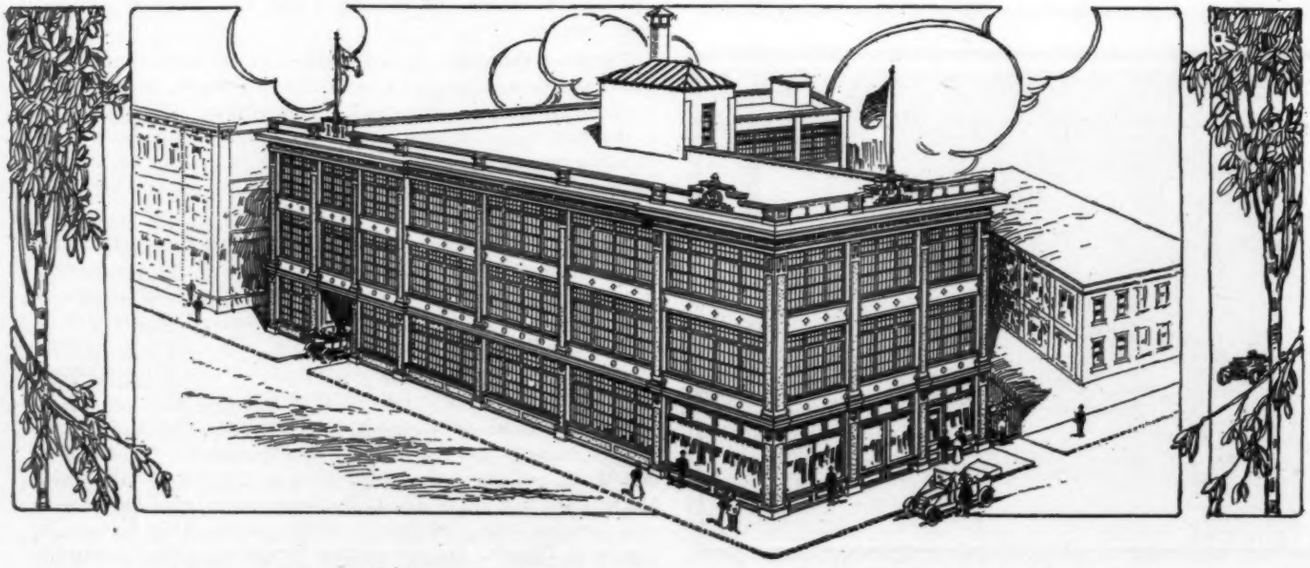
SPRINGFIELD, MASS.—Standard Tire & Rubber Company; capital, $10,000; to manufacture tires and rubber goods. Incorporators: Wm. P. Cromie, Wyne E. Hughes.

SYRACUSE, N. Y.—Bissell Garage Company; capital, $10,000; to conduct a garage business. Incorporators: Wm. H. Bissell, Budd Watte, Philip Manheim.

TROY, ALA.—Troy Garage Company; capital, $7,500; to conduct a garage business. Incorporators: John W. Bowers, T. E. Murphee, C. T. Copeland.

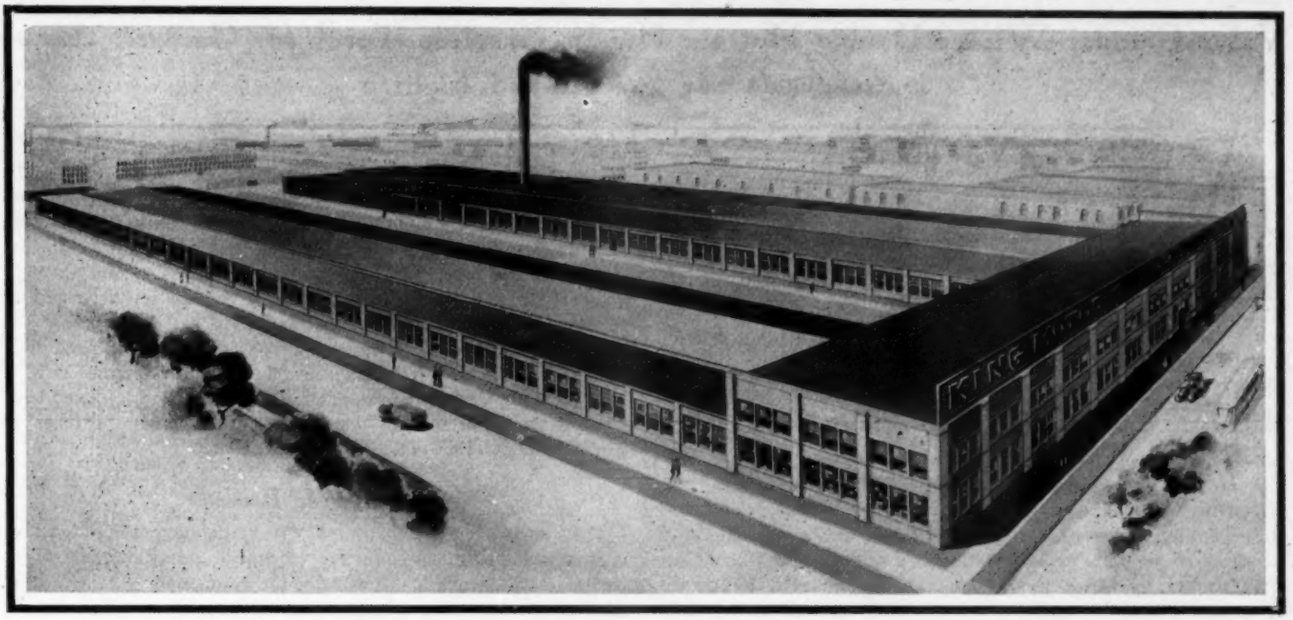
UNION, N. J.—N. Y. Steel Tire Company; capital, $25,000; to manufacture steel tires. Incorporators: E. Ebel, A. F. Wahl, E. Wendland, J. Fulhaber, J. Ferond.

WASHINGTON, D. C.—National Motor Transportation Company; capital, $1,000,000; to conduct a freight automobile transportation business. Incorporators: S. E. Lyon, G. L. Lewis.



Splendidly equipped factory of the Berkshire Motors Company at Cambridge, Mass., a suburb of Boston

OF INTEREST to the INDUSTRY



Bird's-eye view of the factory soon to be occupied by the King Motor Car Company in Detroit

KING COMPANY EXPANDS—On or about March 1, the King Motor Car Company, Detroit, Mich., will move into the factory now occupied by the Hupp Motor Car Company. This move will give the King company a floor space of 70,000 square feet and a capacity of 5,000 cars a year. The factory comprises four concrete block buildings, all connected, with a frontage of 130 feet on Jefferson avenue.

Additions for Kline—The Kline Motor Car Company, Richmond, Va., has plans for its automobile works consisting of two brick and concrete buildings in one, each 60 by 600 feet, as well as a 40 by 60-foot office building.

Duff Company Growing—The Duff Manufacturing Company, Pittsburgh, Pa., has purchased a large plot of ground in the northern section of that city and will build a greatly enlarged plant. Part of the product of the factory is the line of Barrett jacks. John R. Ginley is president of the corporation.

Briggs to Expand—The Briggs Manufacturing Company, located in Hamtramck, Mich., is making preparations to expand in the immediate future, and to this end has filed a petition with the village council for the vacation of an alley running through its property. The company's plans contemplate a five-story addition.

New Plant for McLeary—The McLeary Engineering Company, Toledo, has leased a large brick block on Superior street, and will remove to its new location about March 1. The structure is three stories in height and affords 40,000 feet of floor-space. During the past 2 or 3 years the concern has built up a large trade in the manufacture of auto parts.

Xenia Wants Factory—The plans of the automobile factory committee which was appointed recently in Xenia, O., have taken form in arrangements to raise by subscription a sum of money to be used in the construction of a sample automobile. F. Baldner, a member of the committee, will undertake the building of the car. If the machine is satisfactory a company will be formed.

Tire Plant for Warwood—Warwood, W. Va., is to have a manufacturing plant capitalized at $100,000. The plant will be for the manufacturing of automobile tires of all kinds and grades. The old steel-ceiling plant in North Warwood, which has been in operation for a long while, has been bought and will be made much larger for the purpose. C. G. Paul, of Pittsburgh, is one of the principal promoters behind the industry.

Truck Factory for Wormleysburg—J. D. Hippe, Wormleysburg, Pa., will erect a large brick building on Front street in that city, to be used for a motor truck manufacturing plant. C. C. Bennett, an employee of the Central Iron Works, who will be employed at the new plant, has successfully completed a model truck for use in hauling coal, sand and other like materials, and has orders for seven large trucks. The building is being erected by C. W. Strayer, of Lemoyne, Pa.

Flanders Sells Land—Walter E. Flanders, of the Studebaker Corporation and the Flanders Manufacturing Company, has sold a very choice piece of vacant property at the southwest corner of Woodward and Burroughs avenues, directly opposite the Cadillac Motor Car Company's plant, to M. J. Murphy, of this city for about $50,000.

Goodyear to Build in Detroit—The Goodyear Tire & Rubber Company, of Akron, O., whose local branch was damaged by fire about 10 days ago, has purchased the vacant property at the southeast corner of Jefferson avenue and St. Antoine street, 50 by 200 feet, and is having plans prepared for a modern fireproof store and warehouse building, five or six stories high, as a new permanent home for the branch. This is right in Motor Row and not far from the company's old location. The property is valued at $20,000, but the price paid by the Goodyear company was not made public.

Pratt Buys Economy—W. E. Pratt, of the Pratt Manufacturing Company, Joliet, Ill., has purchased the personal property of the bankrupt Economy Motor Car Company, of that city, and has submitted a bid for the real estate, which probably will be accepted if the real estate is secured. Mr. Pratt will operate the plant for the production of electric vehicles of the light delivery and roadster types developed during the last year by W. R. Everett, formerly president of the Economy Company.

Newest Ideas Among the Accessories

Valve Grinder With a Double Motion; Handy Gasoline Torch for Garages; Automatic Acetylene Starter and Lighter

Parsons Valve Grinder

THE Parsons Valve Grinder Company is the maker of the grinder, Fig. 1. In this device a double motion is employed, being a combination of an oscillatory one with a rotary one. This combined motion is obtained by the use of positively operating gears, which turn continuously, so that all jerks or irregular motions are prevented. The construction of the grinder is very simple. It consists of a planetary gear revolving around a sun, a pin located eccentrically in the planet giving the oscillatory movement. The gears are of hardened steel and packed in grease. An aluminum casing is used.

Turner Gasoline Torch

A hot-blast gasoline torch of tubular design has just been placed on the market by the Turner Brass Works, Sycamore, Ill. The torch consists of a tube, 5 feet 9 inches long, and weighing 7 pounds, which contains a gasoline chamber, an air chamber in which the air may be compressed by means of a hand pump on one end of the tube, and a burner construction on the other. The design is shown in Fig. 2, illustrating the Bunsen type of burner, and the air pump, as well as the handle of a cock between air and gasoline chambers. If the cock is opened, the compressed air forces the gasoline out of the chamber, under great pressure; the fuel is mixed with the proper quantity of air through the office of the burner, and is ignited at the end of the same.

Dual Starter and Lighter

The combined starter and lighter, Fig. 3, made by the Dual Automatic Starter & Lighter Company, Chicago, Ill., uses acetylene for both purposes. In principle it consists of the acetylene tank and a two-way distributer valve attached to the dash. A handle connected with the valve is turned one-quarter to the left, thereby injecting acetylene into the intake manifold and valves, enabling the cylinders to start on the spark. By turning the handle one-quarter to the right, gas is admitted to the lamps; at the same time an electric circuit is closed through a vibrating coil, producing a spark at the igniter arranged at the burner, so that the lamps are lighted. In starting the handle may be left in a position to permit of a continued flow of acetylene to the cylinders; in this way, the engine may be run for some time, until the gas tank is exhausted, on acetylene. This is of advantage in winter, when the engine refuses to work on a gasoline mixture unless hot.

Jovite Carbon Remover

The Carbon-Nit Company, of 103 Fifth avenue, Clinton, Ia., is manufacturing an effective chemical decarbonizer, which comes in gallon cans. Chemically the compound is a very light lubricating oil, which, when burned in the cylinders, loosens the carbon crusting its side walls or the spark-plug electrodes and goes out with these impurities through the exhaust valves. The application of the material is as follows: A quart of Jovite is poured in through the carbureter air intake and the engine is started. At first the motor smokes somewhat, but soon the smoke disappears. When this is the case, an examination will show the carbon to have been removed from the cylinders. Or, if the carbureter intake is not in an accessible location, 1-2 pint of the preparation is poured into each cylinder and, after replacing the spark-plugs, the engine is run. Should one application prove insufficient a small quantity of Jovite is again applied and will then remove all deposits.

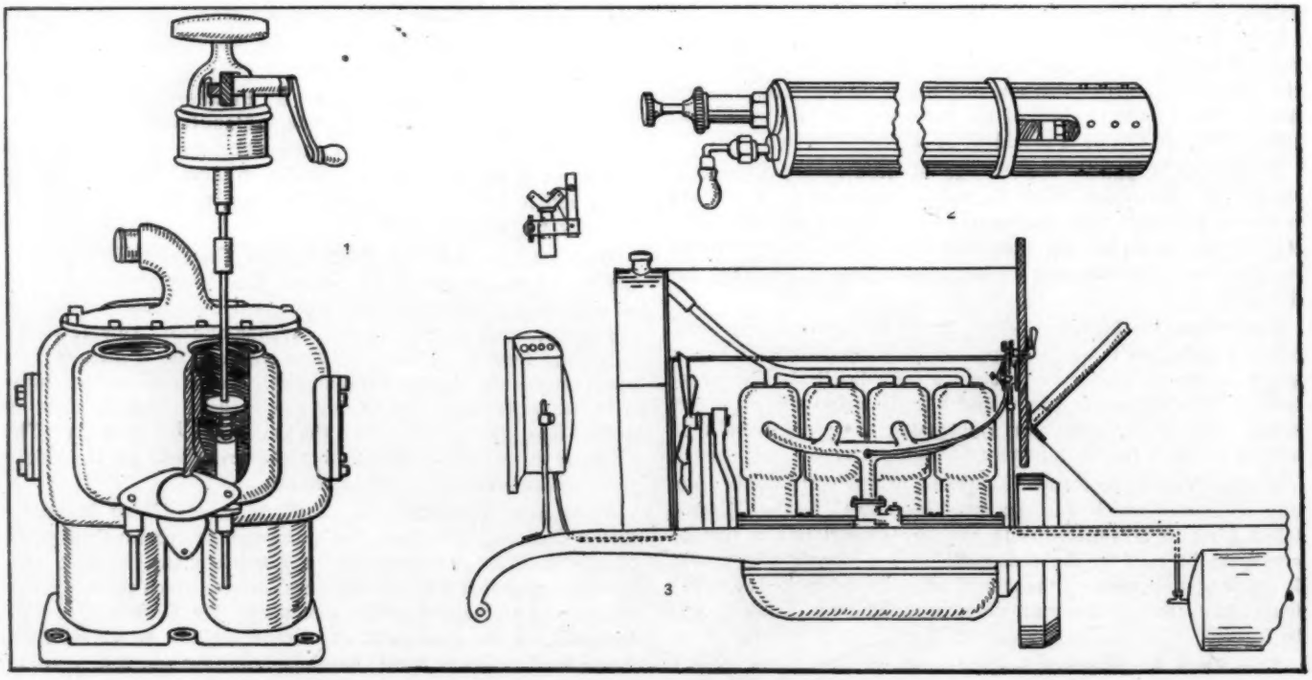


Fig. 1—Parsons valve grinder. Fig. 2—Turner gasoline torch. Fig. 3—Dual starter and lighter

Wetherill Centrifugal Pump

THE water pump shown in Figs. 1 to 3 is made by the Wetherill Finished Castings Company, of Philadelphia. The exterior view of the centrifugal pump is seen in Fig. 3; its casing is cast in two parts, C1 and C2, which are held together by means of eight screws, tightness being maintained by an asbestos washer. The inlet pipe I is cast integrally with the casing half C2, while the outlet entering at the periphery of the casing is cast integrally with C1. The casing is made of phosphor-bronze, machined and ground in its central portions to provide bearings B B for the shaft S. The shaft bearing in the casing part C2 is closed at one end, while in the part C1 it is open, permitting the shaft to pass through it and to be rotated by driving its end S1. Stuffing-box C insures tightness in this place.

The shaft S carrying the pump impeller I1 is shown in detail in Fig. 2. The impeller consists of the plate P cast in one piece with six impelling blades B1 and an axial extension A. The latter is bored and accurately ground to accommodate the shaft S held to it by a spline, which is not visible in the illustration. Behind the plate P is the short end of the shaft which fits into the bearing B of the casing part C2, while C1 is fitted on the long end of the shaft.

In the automobile the inlet pipe is always full of water which is under a pressure corresponding to the height of the water column in the radiator. In this way no suction is required to be exerted by the pump, but all power is used to tortuously lift the water fed to the pump by gravity to the cylinder jackets. The impeller turns in the direction of the arrow, throwing the water in the same direction until it arrives at the outlet O, leaving the casing at a tangent. The impeller or runner is closed on one side by a plate P, while on the other side it bears against the inner surface of the part C1, which is machined to give a close fit against the blades.

The pump is about 6 inches in diameter, so that it may be placed in one of a number of locations about the motor, giving equal results and being readily accessible whenever it is desired to make an inspection.

Meteor Spark Vibrator

To provide a hot, vibrating spark where the regular ignition system creates only a single spark is the work for which the Meteor vibrator is designed. This device is inclosed in a neat wooden box and consists of a vibrating coil which is made to act in conjunction with the magneto. A hot spark is essential in starting a motor on the ignition system especially in cold weather. This vibrator is made by the Meteor Auto Tank Company, of 1666 Broadway, New York.

Thurber Rotary Starter

This new starter comprises a compound air-pressure pump located on the top of one of the engine cylinders and compressing air on every firing stroke of the cylinder. The compressed air is delivered to a compressed-air tank, Fig. 4, which is connected by a push valve with the starter proper or Thurber turbine. If the valve is pushed, compressed air is admitted to the starter and rotates it. The rotary starter, being connected by gearing

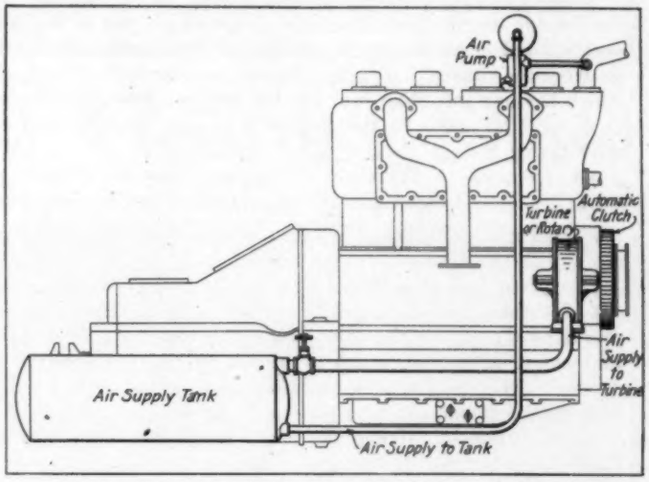


Fig. 4—Arrangement of units in Thurber rotary starter

to the front end of the crankshaft, turns it over, much in the same manner as a starting crank, and after having started the motor is disengaged and remains idle. The gear of the rotary starter is connected to the front end of the crankshaft by means of an automatic clutch, in front of which is bolted a fan pulley permitting of carrying the starting crank in its normal place.

The simplicity of this system is illustrated by the fact that it contains only two valves; one is a check valve, through which the incoming air passes, and the other is the push valve, which allows the compressed air to enter the starter which is made by the Chalmers Motor Company, of Louisiana, Ltd., New Orleans, La.

Icy-Hot Lunch Baskets

The new automobile lunch baskets of the Icy-Hot Bottle Company, Cincinnati, O., are made in three sizes, for two, four and six persons. They are equipped with the necessary plates, cups, saucers, knives, spoons, forks and napkins, not forgetting the salt and pepper shakers. Each element of the outfit is securely held in place to prevent rattling.

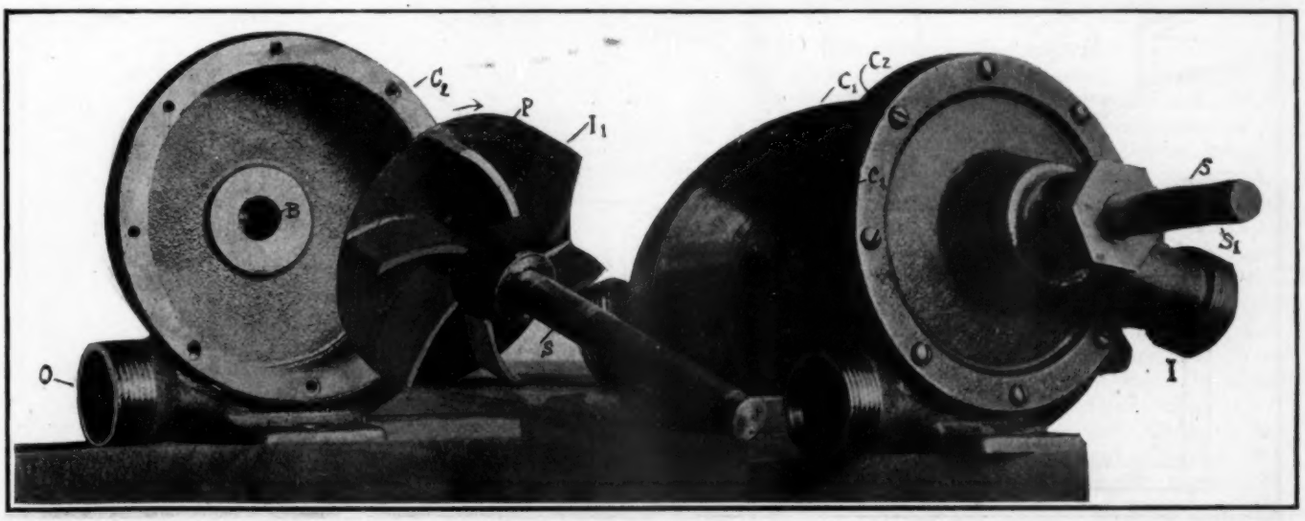


Fig. 1—Outlet casting of Wetherill pump. Fig. 2—Impeller and inlet casting of the pump. Fig. 3—Complete pump assembled for use

PATENTS GONE TO ISSUE

SHOE CLEANER—A board attached to the side of a car serving as a shoe scraper.

This patent protects a shoe cleaner, Fig. 1, attached to the running board of an automobile, comprising a pair of channel bars secured to the underside of that board and at an angle to it. Between the channel bars a rectangular member is held in place, which has one side sharpened for the purpose above-mentioned. A stop is attached to the running board to limit the movement of the cleaning plate.

No. 1,017,096—to Fradelson Harris and Rosalind Sternberg, St. Louis, Mo. Granted February 13, 1912; filed June 16, 1910.

Windshield Cleaner—A wiper attached to a rotating rod secured to the frame of the windshield.

This patent covers a cleaner, Fig. 2, consisting of a rod, one end of which is secured to the frame of the windshield and journaled there. To the other end of the rod an arched elastic member is secured, which is pressed against the glass plate of the shield, so that a wiper held between the ends of the arch can be moved over the plate to clean it.

No. 1,017,078—to Henry F. Buth, assignor to the Kimbo Company, Chicago, Ill. Granted February 13, 1912; filed April 22, 1909.

Vehicle Wheel—In which springs under compression take the place of straight spokes.

This wheel, Fig. 3, besides a rim and a hub, consists of a number of flat steel springs bent with a U-shaped portion in their middle section. The outer end of each spoke is formed into a hook engaging clips which are attached to the rim; the hooks being between the shanks and the rim. The inner ends of the spokes are likewise held to the hub by means of clips.

No. 1,017,236—to Ivar L. Tvinde, Watertown, S. D. Granted February 13, 1912; filed March 9, 1911.

Spring Repairer—A device for keeping broken springs in service in case of an emergency.

This spring repairer consists of a flat spring shorter than the broken one and having eyes in its extremities. Through these eyes a rod passes which again has an eye in one end and a hook in the other. In the last-mentioned eye one end-link of a chain is engaged, and a sufficient length of the spring is led around the broken spring and then engaged with the hook.

No. 1,017,485—to John H. Warner, Mount Pocono, Pa. Granted February 13, 1912; filed June 29, 1911.

Shock Absorber—Being of the combined leaf-spring and cylinder type.

This shock absorber consists of a carriage spring supporting the body of a car resting above the axle, to which latter a crosshead is attached. Stems pass through the ends of the crosshead; the stems have pistons secured to their upper ends, while the pistons are guided by cylinders held to the body. Springs surround the stems, being arranged between crosshead and pistons, and springs are also wound around the stems below the crossheads, to resist any upward movement of the stems.

No. 1,017,435—to Henry Luxembourger, Jr., Los Angeles, Cal. Granted February 13, 1912; filed April 18, 1910.

Clutch—In which engagement is made by brakeshoes and pins engaging openings in the flywheel.

This clutch is combined with a flywheel faced with a brake band and mounted on an axle on which a loose-ribbed sleeve is located. A sliding collar is provided with a recess permitting of engagement with the ribs of the sleeve, on which is mounted a spider. Pivotally connected with the arms of the spider are angular arms of a number of brakeshoes which are normally held out of contact with the brake band. Angularly arranged rods connect the brakeshoes with the collar, the latter having a number of openings, in which pins are located; these pins are adapted to contact with and be partly ejected by springs located in the openings. The flywheels have as many openings as there are pins, both being adapted to register if the collar is brought into a suitable position.

No. 1,017,577—to James K. McKelvey, Warnock, O. Granted February 13, 1912; filed May 9, 1911.

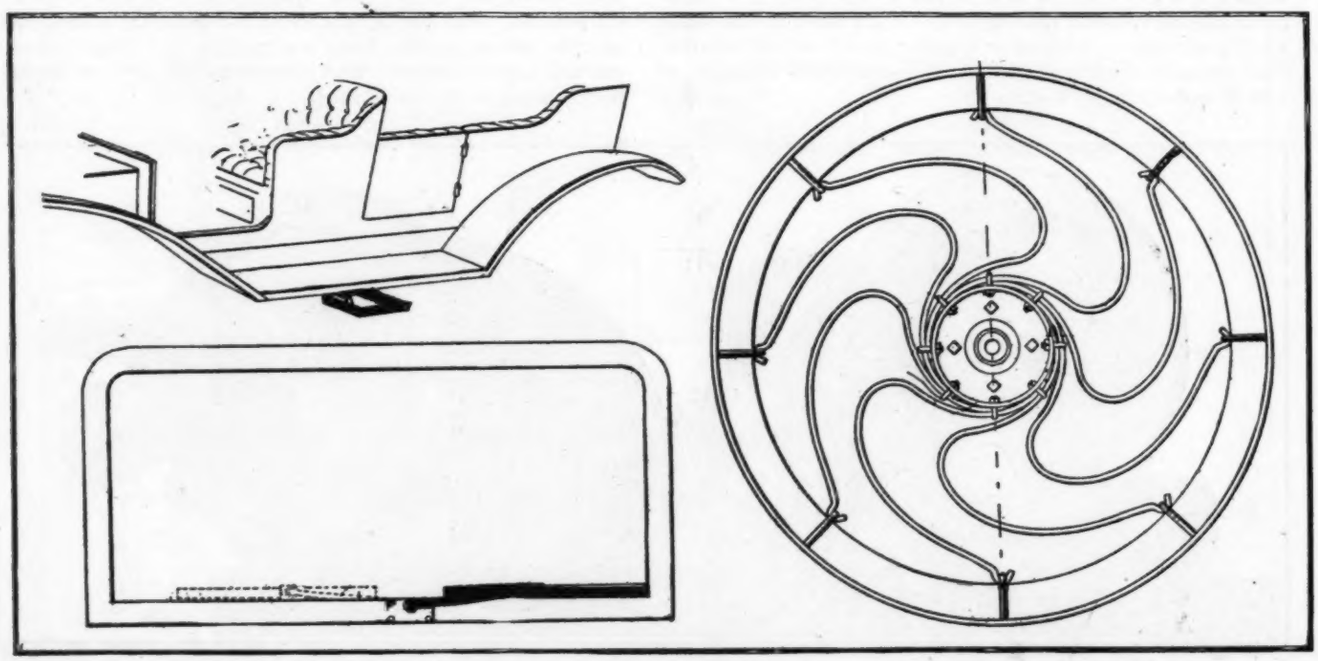


Fig. 1—Harris-Sternberg shoe cleaner. Fig. 2—Buth windshield cleaner. Fig. 3—Tvinde spring wheel